

**ALT286 / ALT386SX**

**LAPTOP COMPUTER**

**V.FTZ**

**SERVICE MANUAL**

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## TECHNICAL SPECIFICATION


MODEL	ALT286	ALT386SX
Processor	80286	80386SX
Speed	16MHz (switchable to 8 MHz)	16MHz (switchable to 8MHz)
Wait States	1 (0 with 60ns DRAM)	0.6 (0 with 60ns DRAM)
RAM	1Mb (2Mb and 4Mb upgrades)	1Mb (2Mb and 4Mb upgrades)
Expansion Slot	nal 16-bit, half length	1 x 16-bit, half length
Power Save Features	Power down of LCD & HDD after user selectable time or keystroke	Power down of LCD & HDD after user selectable time or keystroke
Hard Disk (Voice Coil Type)	20Mb (28ms access time)	40Mb (25ms access time)
Floppy Drive	1 x 3.5" x 1.44Mb	1 x 3.5" x 1.44Mb
External Floppy Drive	1 x 3.5" x 720Kb or 1.44Mb	1 x 3.5" x 720Kb or 1.44Mb
Connector suitable for use with	/5.25" x 360Kb or 1.2Mb	/5.25" x 360Kb or 1.2Mb
Graphics	VGA/EGA/CGA/MDA/Hercules	VGA/EGA/CGA/MDA/Hercules
Parallel Port	1 x 25-pin D-type	1 x 25-pin D-type
Serial Port	2 x 9-pin D-type	2 x 9-pin D-type
Keyboard	85-key, integrated numeric keypad, 12 function keys	85-key, integrated numeric keypad, 12 function keys
Maths co-processor	Socket available	Socket available
System Reset Switch	Available	Available
External Interfaces	VGA Monitor Port IBM AT Compatible Keyboard Socket	VGA Monitor Port IBM AT Compatible Keyboard Socket
Power Supply	Internal 110-220-240V AC Self-Switching PSU Removable Rechargeable NiCad Battery Pack 2 Hour Life with Normal Usage	Internal 110-220-240V AC Self-Switching PSU Removable Rechargeable NiCad Battery Pack 2 Hour Life with Normal Usage
Battery Charging	Built In Battery Charger Unit 2 Hour Charge Time on "Quick Charge"	Built In Battery Charger Unit 2 Hour Charge Time on "Quick Charge"
Supplied Software	MS-DOS 3.30 Operating System	MS-DOS 3.30 Operating System
<b>DIMENSIONS</b>		
Width	318mm	318mm
Depth	380mm	380mm
Height	95mm	95mm
Weight	7.00Kg (inc. battery pack) 6.00Kg (without battery pack)	7.00Kg (inc. battery pack) 6.00Kg (without battery pack)
<b>SCREEN</b>		
Type	Backlit LCD	Backlit LCD
Dimensions	223 x 169mm	223 x 169mm
Resolution	640 x 480 pixels	640 x 480 pixels
Grey Scales	32 in 256-colour VGA mode	32 in 256-colour VGA mode

## SAFETY TEST

All monitors are tested to the following specifications.

- Flash Test:** Test at 1.5kV RMS / 3 sec between the live and neutral poles of the mains lead and all accessible metal points on the exterior of the set.
- Insulation Resistance Test:** Test at 1.5kV RMS / 3 sec between the live and neutral poles of the mains lead and all accessible metal points on the exterior of the set to show a resistance greater than 4Mohms.
- Earth Continuity Test:** The resistance of the mains lead shall not exceed 0.5ohms.

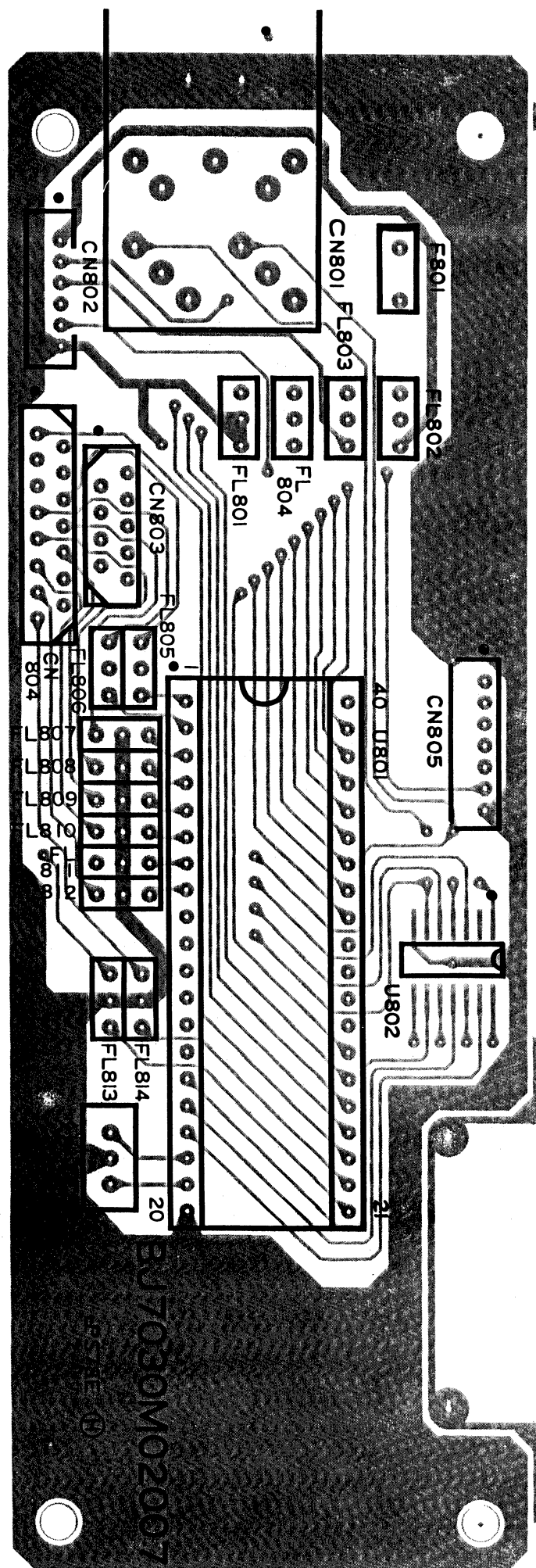
**PLEASE NOTE:** When any work is completed on this unit, correct safety tests must be carried out to ensure continued electrical safety.

**PLEASE NOTE:** All parts shown with the part number prefix  are Safety Items and must be replaced with similar items having an identical safety specification.

All those items may be purchased direct from AMSTRAD plc.



ALT286/386SX  
KEYBOARD P.C.B.

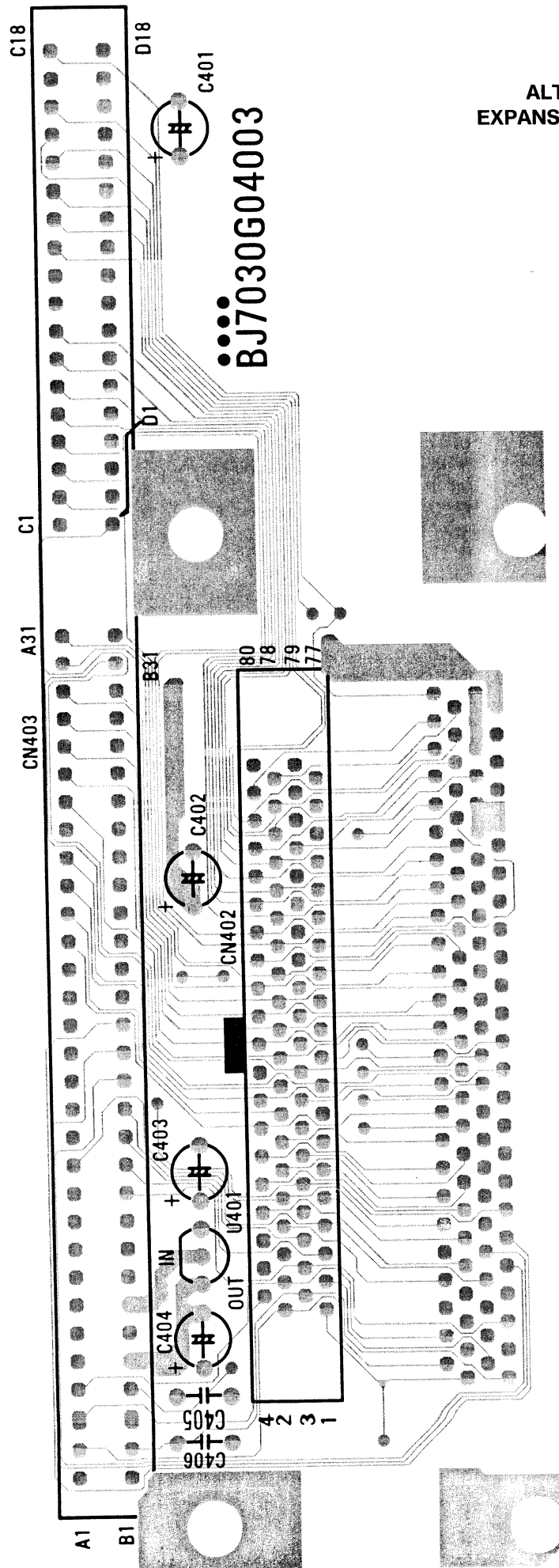


BU7030M02007

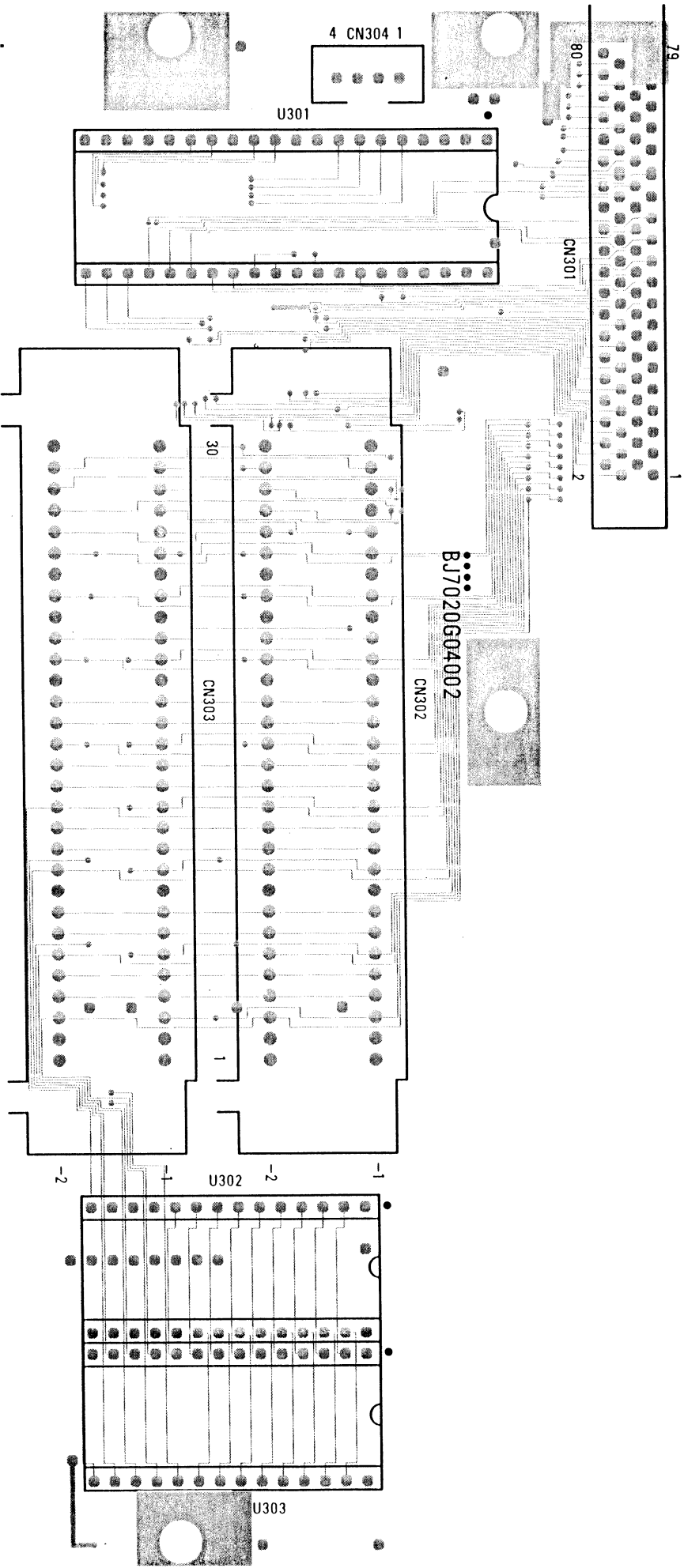
PS7AE 10



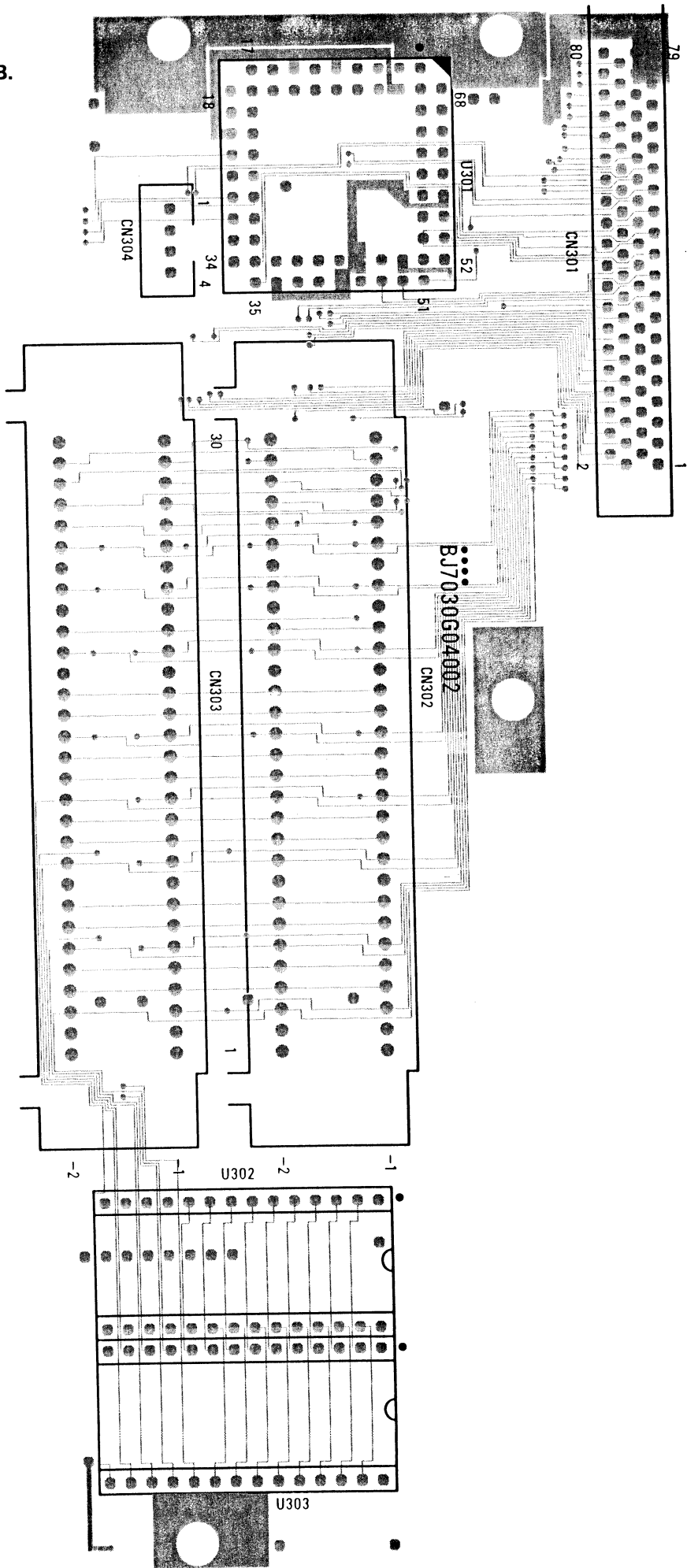
ALT286/386SX  
EXPANSION SLOT P.C.B.



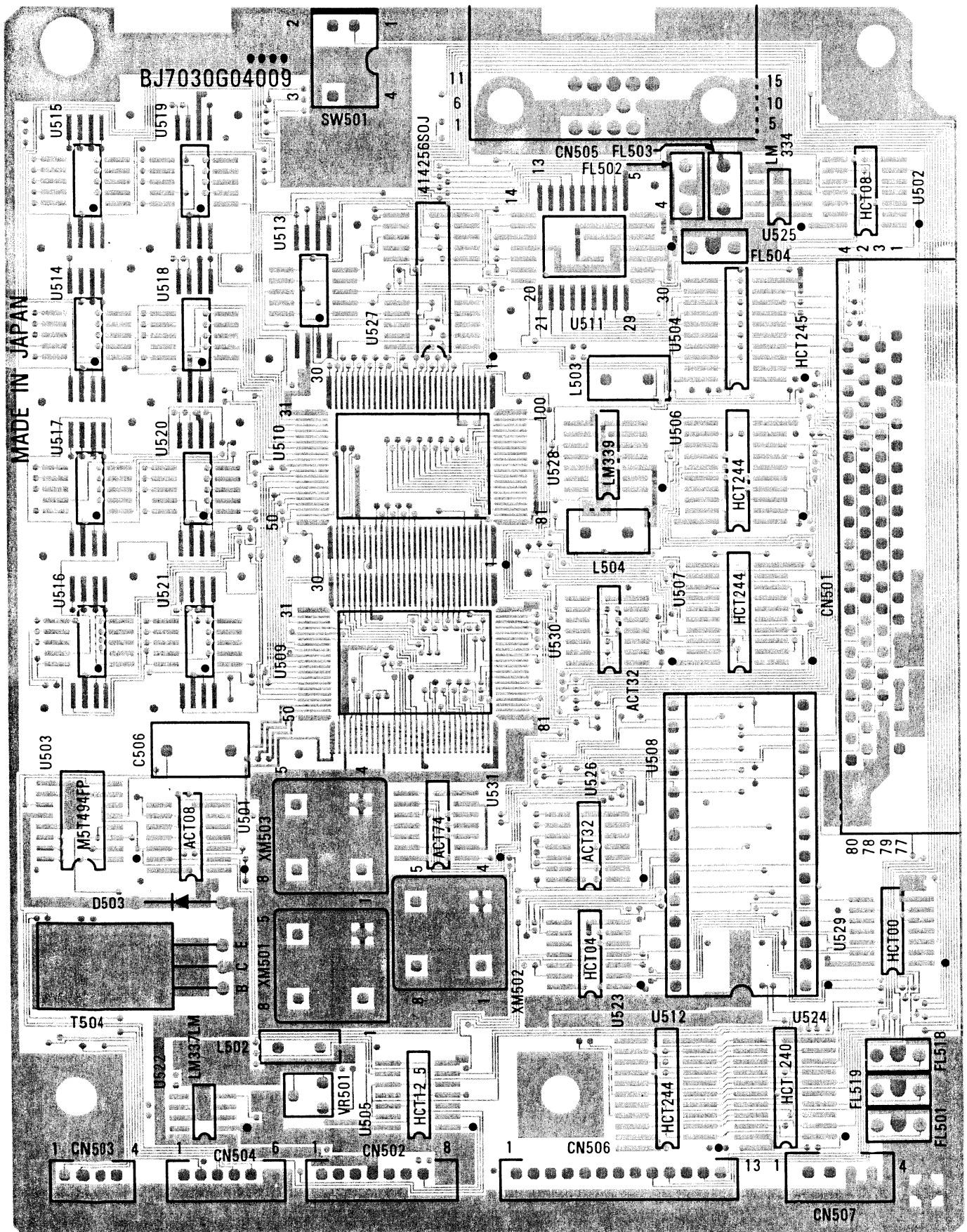
ALT286  
CO-PROCESSOR P.C.B.  
TOP VIEW



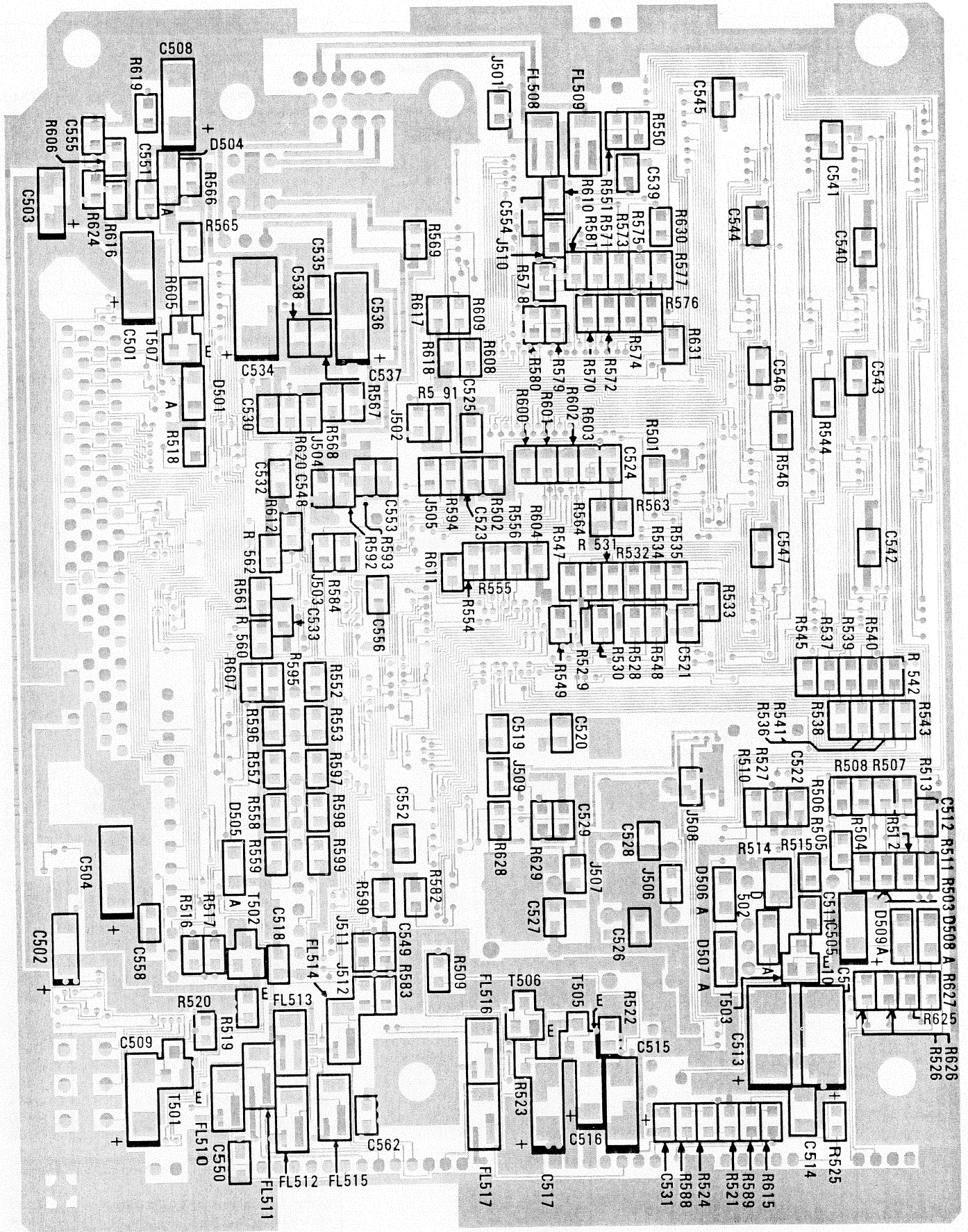
ALT386SX  
CO-PROCESSOR P.C.B.  
TOP VIEW



# ALT286/386SX VGA P.C.B. COMPONENT LAYOUT TOP VIEW







# ALT286/386SX ELECTRICAL PARTS LIST

Ref. No.	Description	Part No.
<b>PCB's</b>		
PCB1	PCB Main	270354FTZ
PCB1-2	PCB LED Reset	270354-2
PCB1-3	PCB LED	270354-3
PCB2	PCB Co-Pro	270351FTZ
PCB3	PCB Slot	270353FTZ
PCB4	PCB VGA	270563
PCB5	PCB D-Ram	270352
PCB6	PCB Keyboard	270355FTZ
PCB7	PCB DC/AC	270356FTZ
<b>IC's</b>		
U101	IC FIP N80L286-16XS 16 Bit CPU	270358
U102	IC VL82C201-16QC Chip Set	270359
U103	IC VL82C204-16QC Chip Set	270360
U104	IC VL82C203-16QC Chip Set	270361
U105	IC VL82C100-QC Chip Set	270362
U106	IC MB88202-1008 4 Bit 1 Chip Micro Processor	270363
U113, 504	IC PC74HCT245T-T HCMOS LOGIC	270364
U114	IC 74F04SJ/63	270365
U115	IC TC74ACT32F-EL ACMOS LOGIC	270366
U117, 505	IC PC74HCT125T-T HCMOS LOGIC	270367
U118	IC PC74HCT74T-T HCMOS LOGIC	270368
U119, 529	IC PC74HCT00T-T HCMOS LOGIC	270369
U120	IC PC74HCT367T-T HCMOS LOGIC	270370
U121	IC VL82C202-16QC Chip Set	270371
U123	IC VL16C452-AQC	270372
U124	IC M5L8042 8 Bit 1 Chip Micro Processor	270373
U125	IC DP8473V FDD Controller	270374
U126	IC MC146818AF RTC Controller	171399
U127	IC HEF4069UBT-T	270375
U128	IC PAL20L8BCNSTD	270376
U129-130	IC SN74HCT244NS/TC74HCT244AF-EL	270377
U132, 135	IC DS14C88M/63 RS232C Driver	270378
U133, 134, 136	IC DS14C89AM/63 Receiver	270379
U137	IC PST529D-2 Reset	270380
U138	IC PC74HCT14T-T HCMOS LOGIC	270381
U139	IC TC74HCT00AF-EL	270382
U141	IC 74F00SJ/63	270383
U142	IC 74F10SJ/63	270384
U143	IC N74F19D-T	270385
U302	IC TMS27C256-20JL	270386
U303	IC TMS27C256-29JL	270387
U501	IC TC74ACT08F-EL	270388
U502	IC PC74HCT08T-T HCMOS LOGIC	270389
U503	IC M5T494FP Switching Control	270390
U122, 506, 507, 512	IC PC74HCT244T-T HCMOS LOGIC	270391
U508	IC M5M27C512AK-15 CMOS EPROM	270392
U509	IC CL-GD620 VGA	270393
U510	IC CL-GD610 VGA	270394
U511	IC MSG176J-4 Colour Palette	270395
U513	IC M5M4464AJ-8 Dram	270396
U514-521	IC MN41464AJ-09/UPD41464L-10-E3	270397
U522	IC LM337LM/63 3 Terminal Reg.	270398
U523	IC PC74HCT04T-T HCMOS LOGIC	270399
U524	IC PC74HCT240T-T HCMOS LOGIC	270400
U525	IC LM334M/63 Regulator	270401
U526, 530	IC TC74ACT32F-EL	270402
U401	IC LM79L05ACZ 3 Terminal Reg.	270403
U801	IC MSM80C51RS 1 Chip Micro	270404
U803	IC SN74LS07NS TTL(LS)	270405
U901	IC MN41C4256SJ-08 DRAM	270406
U902	IC UPD424256LA-80-E2 DRAM	174025
U903	IC MN41256AJ-08 DRAM	270564

Ref. No.	Description	Part No.
<b>Switches</b>		
SW101	Switch, DIP KSP10	270407
SW501	Switch, DIP KSP02	270408
SW701	Switch, Slide SSSF-S-001	270409
SW1001	Switch, Tact SKHHQN001	270410
<b>Diodes</b>		
D101-104, 501, 504-507, 801	D RLS4151	270411
D502	DZ RLZ3.3B	270412
D503	D RGP-10D	270413
DA101	D SN74S1053NS Array	270414
<b>Transistors</b>		
T101, 105	TR 2SC2412(K)	270415
T102	TR 2SD1664	270416
T103, 106, 107	TR DTA144EK	270417
T104	TR 2SA1037K	270418
T501, 505	TR 2SB1198K	270419
T502	TR 2SD1483K	270420
T503, 506, 507	TR DTC144EK	270421
T504	TR 2SC2334-S3	270422
T701, 702	TR 2SC3328YTPE6	270423
<b>Coils &amp; Inductors</b>		
L501	Chip Inductor BLM31A02	270424
L502-504	Choke Coil (SN) SNT-S20	270425
L701	Inductor TSL1110-221KR68	270426
<b>Variable Resistors</b>		
VR501	VRSF RH0421C	270427
VR701	VROT RK08H1110 1kΩ	176673
VR702	VROT RK08H1110 5kΩ	270429
<b>Crystals</b>		
X101	X'Tal Resonator AT-49 14.31818M	270430
X103	X'Tal Resonator DT-38-32.768kHz	176174
X104	X'Tal Resonator AT-49 24M	270431
XM101	X'Tal Module DOC-70 64M	270432
XM102	X'Tal Module DOC-2E 1.8432M	176173
XM501	X'Tal Module KHO-CS1-E 25.175M	176179
XM502	X'Tal Module KHO-CS1-E 28.322M	176178
XM503	X'Tal Module DOC-431CC 32.514M	270433
<b>Miscellaneous</b>		
FL101, 102, 104, 109-113, 115, 116	Chip Tube Filter NFM61T20472	270434
FL105, 107, 108	Filter NFV610-655-T2A-506	270435
FL106	Filter NFV610-655-T2A-107	270436
FL301	Chip Filter NFM61T20472	270437
FL117-123, 501-119	Chip Filter NLL4532T-4R7222H	270438
FL701	Filter DSS30S-91B471M	270439
D1001-1003, 1006	LED (Green) GL3KG18	270440
D1004, 1005	2 Colour LED	270441
L101-104, 109	Bead Core	270443
L801-804	Bead Core BL02RN2-R62T2	270444
BT101	NI-CD Battery	270450
TC101	Trimmer Capacitor	270446
F801	ICPF25 IC Protector	270447
X801	Ceramic Resonator CST6.00MGW	270448
T701	Transformer FN-1051	270449
	Mains Lead U.K.	270053
	Mains Lead Euro	270054
	Users Instructions ALT286/386SX	UI-ALT286/386SX
	System Disk VER 3.3	Soft 33000/UK
	Country Variance KBD + Key Puller	270445

**ALT386SX ELECTRICAL PARTS LIST**  
(parts additional to preceding list)

Ref. No.	Description	Part No.
<b>P.C.B.s</b>		
PCB1	PCB Main	270673FTZ
PCB2	PCB Co Pro/Mem	270650FTZ
<b>IC's</b>		
U101	IC NG80386SX-16 32 Bit CPU FIP	270653
U107	IC PAL16R8BCNSTD PAL	270654
U108	IC PAL16R8ACNSTD PAL	270655
U109-111	IC PC74HCT373T-T HCMOS LOGIC	270656
U116	IC SN74LS06NS TTL (LS)	175043
U122	IC VL82C205A-16QC Chip Set	270658
U302	IC TMS27C256-20 JL EPROM	270674
U303	IC TMS27C256-20JL EPROM	270675
U401	IC LM79L05ACZ 3 Terminal Reg.	270403
U501	IC TC74ACT08F-EL AC MOS LOGIC	270388
U113, 129, 130, 504	IC PC74HCT245T-T HCMOS LOGIC	270364
U505	IC PC74HCT125T-T HCMOS LOGIC	270367
U112, 131	IC PC74HCT244T-T HCMOS LOGIC	270391
U144	IC PC74HCT04T-T HCMOS LOGIC	270399
U115	IC TC74ACT32F-ELAC MOS LOGIC	270402
U119, 139, 529	IC PC74HCT00T-T HCMOS LOGIC	270369
U902	IC UPD424256LA-10-E2 DRAM	174025
U903	IC MN42156AL-08/ UPD41256L-10-E3	171400
<b>Diodes</b>		
D101-104, 501, 504-507, 801	D RLS4151	270411
D502	DZ RLZ3.3B Zener Diode	270412
D503	D RGP-10	270413
DA101	D SN74S1053NS Array	270414
<b>Transistors</b>		
T502	TR 2SD1484K	270661
<b>Miscellaneous</b>		
FL101-104, 109-116	Chip Tube Filter NFM61T20472	270434
FL103, 106	Filter NFV610-655-T2A-107	270436
FL105, 107, 108	Filter NFV610-655-T2A-506	270435
FL301, 302	Chip Filter NFM61T20472	270437

### CABINET PARTS LIST

Ref.	Description	Part No.
UN-6	NI-CD Battery Pack	270450
A-1	LCD Cover	270451
B-5	Battery Terminal -	270453
B-6	Battery Terminal +	270454
UN-8	Speaker	270455
A-3	Bottom Cabinet 286	270456FTZ-2
A-3*	Bottom Cabinet 386	270456FTZ-3
A-13 + A-14 + A-15 + B25 + L15	Top Cabinet Assembly	270458
A-13	Top Cabinet	270459
A-14	Main LED Cover	270461
B-26	Tilt Arm Unit	270462
A-15	Spacer	270463
B-27	Support Bracket	270464
UN-2	Keyboard Unit	270465
A-16	LCD Panel	270466
UN-5 + A17	LCD Protect Sheet + LCD Unit	270468
A-18	LCD Case	270469
B-7	Main PCB Sheet	270470
A-4	Foot	270471
A-5	Lock Knob Battery	270472
B-9	FDD Chassis	270473
B-10	Handle Bracket L	270474
B-11	Handle Bracket R	270475
A-2	Bottom Case Cover	270476FTZ
B-13	Bottom Cover Support Bracket	270477
B-12	Lock Spring B	270479
B-8	VGA Sheet	270481
B-14	HDD Bracket	270482
UN-4	Hard Disk Unit 20MB	270483-20
UN-4*	Hard Disk Unit 40MB	270483-40
A-7	Handle Assembly	270484
B-15	Handle Chassis	270485
B-16	Handle Chassis L	270486
B-17	Handle Chassis R	270487
A-6	Rating Label ALT286	270488
A-6*	Rating Label ALT386SX	270668
A-12	Brand Badge ALT286	270489
B-9	Floppy Bracket	270490
UN-3	Floppy Disk Unit	270491
UN-1	Power Supply Unit	270492
A-10 + A-12	Caser Cover Assembly 286	270493FTZ-2
A-10 + A-12*	Case Cover Assembly 386	270493FTZ-3
A-10	Case Cover	270494
A-11	Window Cover	270495
A-12*	Badge ALT386SX	270676
A-19	Lock Lever L	270497
A-20	Lock Lever R	270498
B-31	Hinge Bracket	270499
A-21	Switch Cover	270500
A-22	Contrast Knob	270501
B-28	LCD Case Bush	270502
B-32	Lock Spring A	270503
B-33	LCD Support Bracket	270504
UN-7	Fan Motor 0410-12	270505
B-34	Inverter Seat	270442
B-36	Skid Bracket	270496
B-2	Power Cover	270562

\* Parts apply to ALT386SX only.



**CABINET EXPLODED VIEW**

This diagram illustrates the exploded view of the J7030XB and J7020XB computer cabinets. The components are labeled as follows:

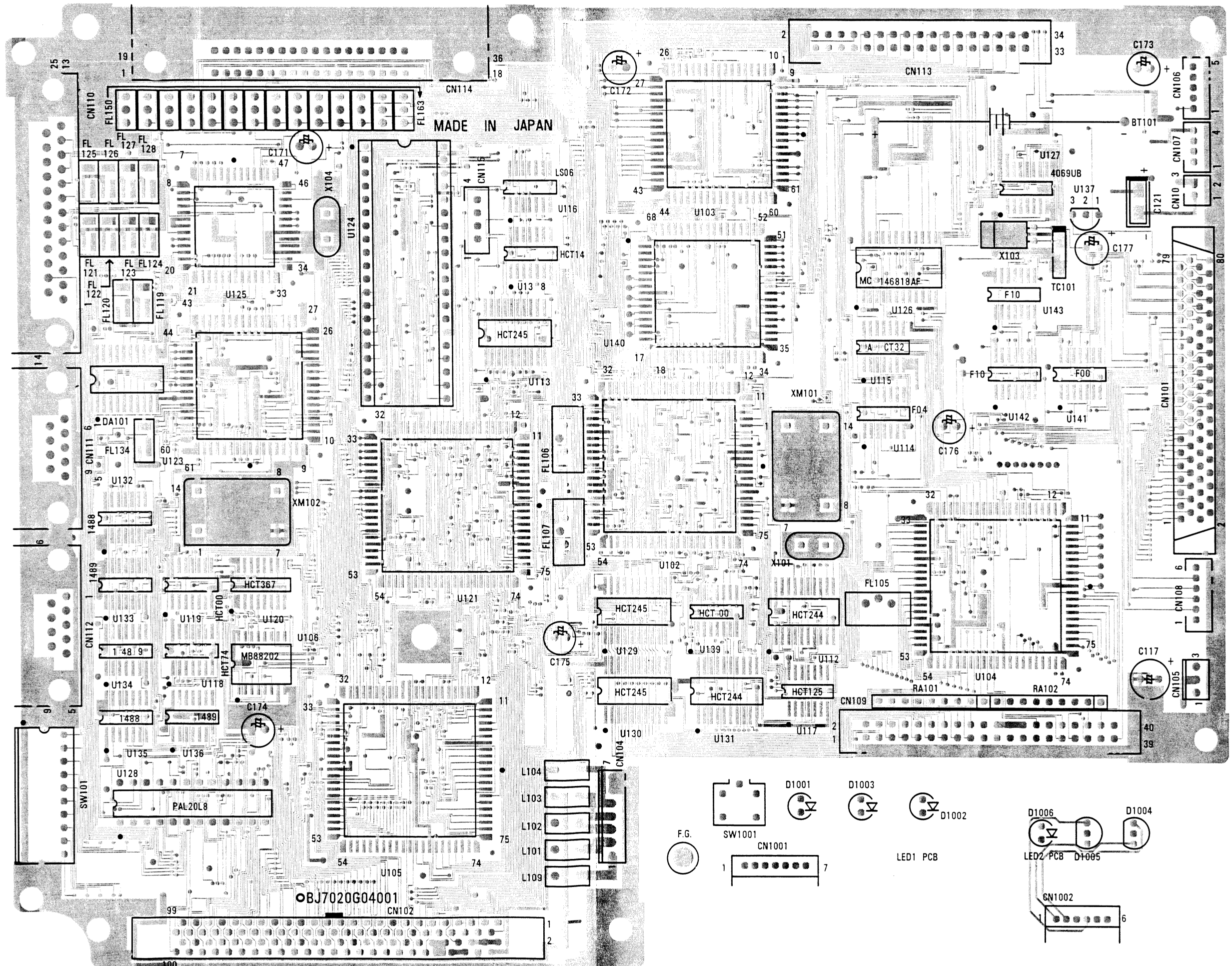
- Top Panel:** A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, A-17, A-18, A-19, A-20, A-21, A-22, A-23, A-24.
- Front Panel:** B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11, B-12, B-13, B-14, B-15, B-16, B-17, B-18, B-19, B-20, B-21, B-22, B-23, B-24, B-25, B-26, B-27, B-28, B-29, B-30, B-31, B-32, B-33, B-34, B-35, B-36, B-37, B-38, B-39, B-40, B-41, B-42, B-43, B-44, B-45, B-46, B-47, B-48, B-49.
- Internal Components:** L-1, L-2, L-3, L-4, L-5, L-6, L-7, L-8, L-9, L-10, L-11, L-12, L-13, L-14, L-15, L-16, L-17, L-18, L-19, L-20, L-21, L-22, L-23, L-24, L-25, L-26, L-27, L-28, L-29, L-30, L-31, L-32, L-33, L-34, L-35, L-36, L-37, L-38, L-39, L-40, L-41, L-42, L-43, L-44, L-45, L-46, L-47, L-48, L-49, L-50, L-51, L-52, L-53, L-54, L-55, L-56, L-57, L-58, L-59, L-60, L-61, L-62, L-63, L-64, L-65, L-66, L-67, L-68, L-69, L-70, L-71, L-72, L-73, L-74, L-75, L-76, L-77, L-78, L-79, L-80, L-81, L-82, L-83, L-84, L-85, L-86, L-87, L-88, L-89, L-90, L-91, L-92, L-93, L-94, L-95, L-96, L-97, L-98, L-99, L-100.
- Other Components:** UN1, UN2, UN3, UN4, UN5, UN6, UN7, UN8, UN9, UN10, UN11, UN12, UN13, UN14, UN15, UN16, UN17, UN18, UN19, UN20, UN21, UN22, UN23, UN24, UN25, UN26, UN27, UN28, UN29, UN30, UN31, UN32, UN33, UN34, UN35, UN36, UN37, UN38, UN39, UN40, UN41, UN42, UN43, UN44, UN45, UN46, UN47, UN48, UN49, UN50, UN51, UN52, UN53, UN54, UN55, UN56, UN57, UN58, UN59, UN60, UN61, UN62, UN63, UN64, UN65, UN66, UN67, UN68, UN69, UN70, UN71, UN72, UN73, UN74, UN75, UN76, UN77, UN78, UN79, UN80, UN81, UN82, UN83, UN84, UN85, UN86, UN87, UN88, UN89, UN90, UN91, UN92, UN93, UN94, UN95, UN96, UN97, UN98, UN99, UN100.

The diagram shows the assembly sequence and the relative positions of the components. The components are labeled with their respective part numbers and are shown in their exploded positions relative to the main assembly.

**J7030XB  
J7020XB**

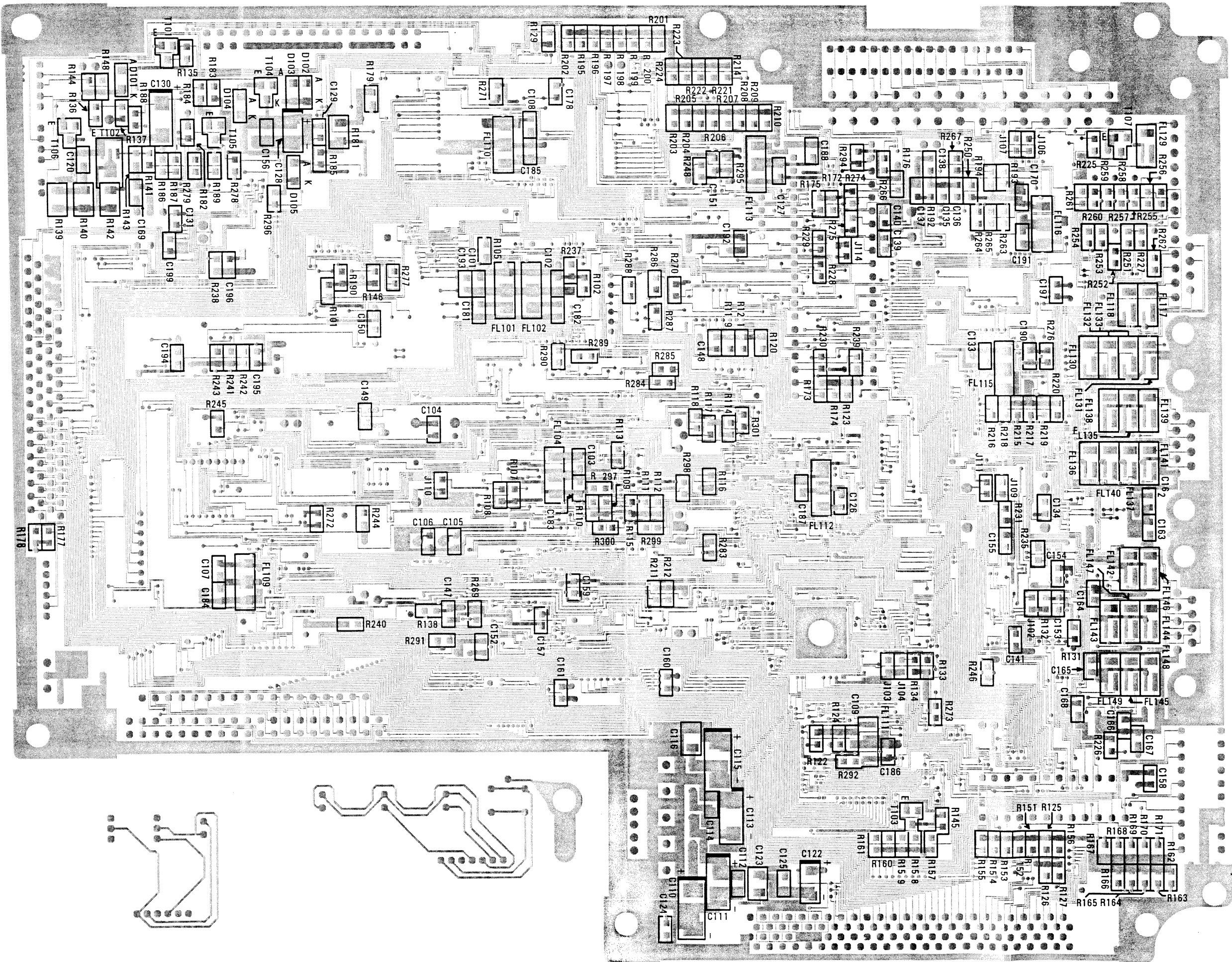
13

# ALT286 MAIN P.C.B. TOP VIEW



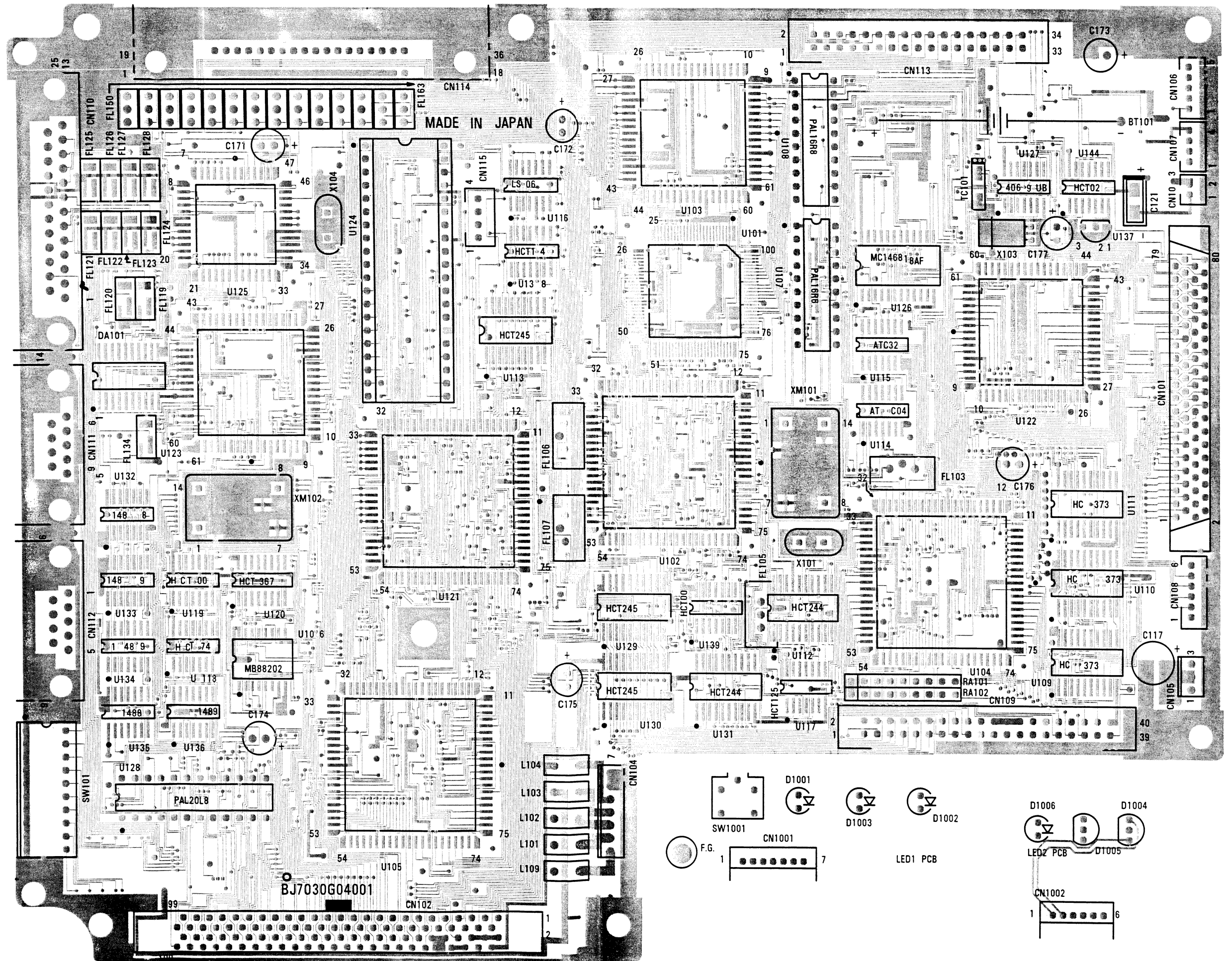


### ALT286 MAIN P.C.B. BOTTOM VIEW



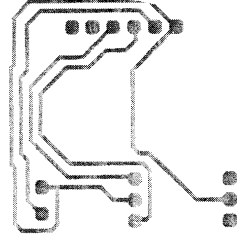
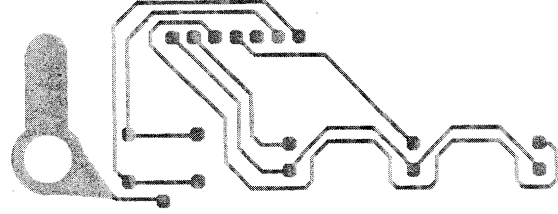
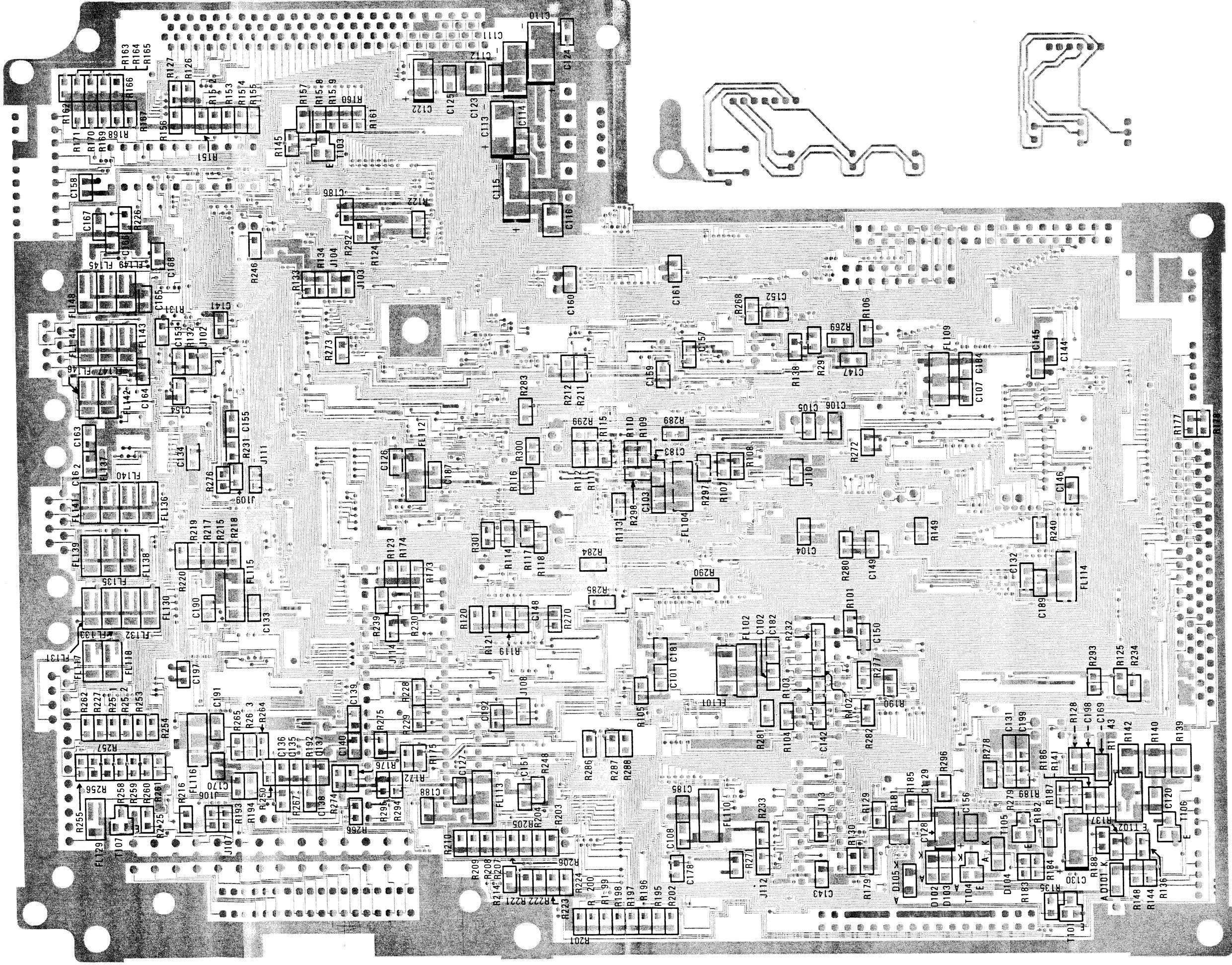


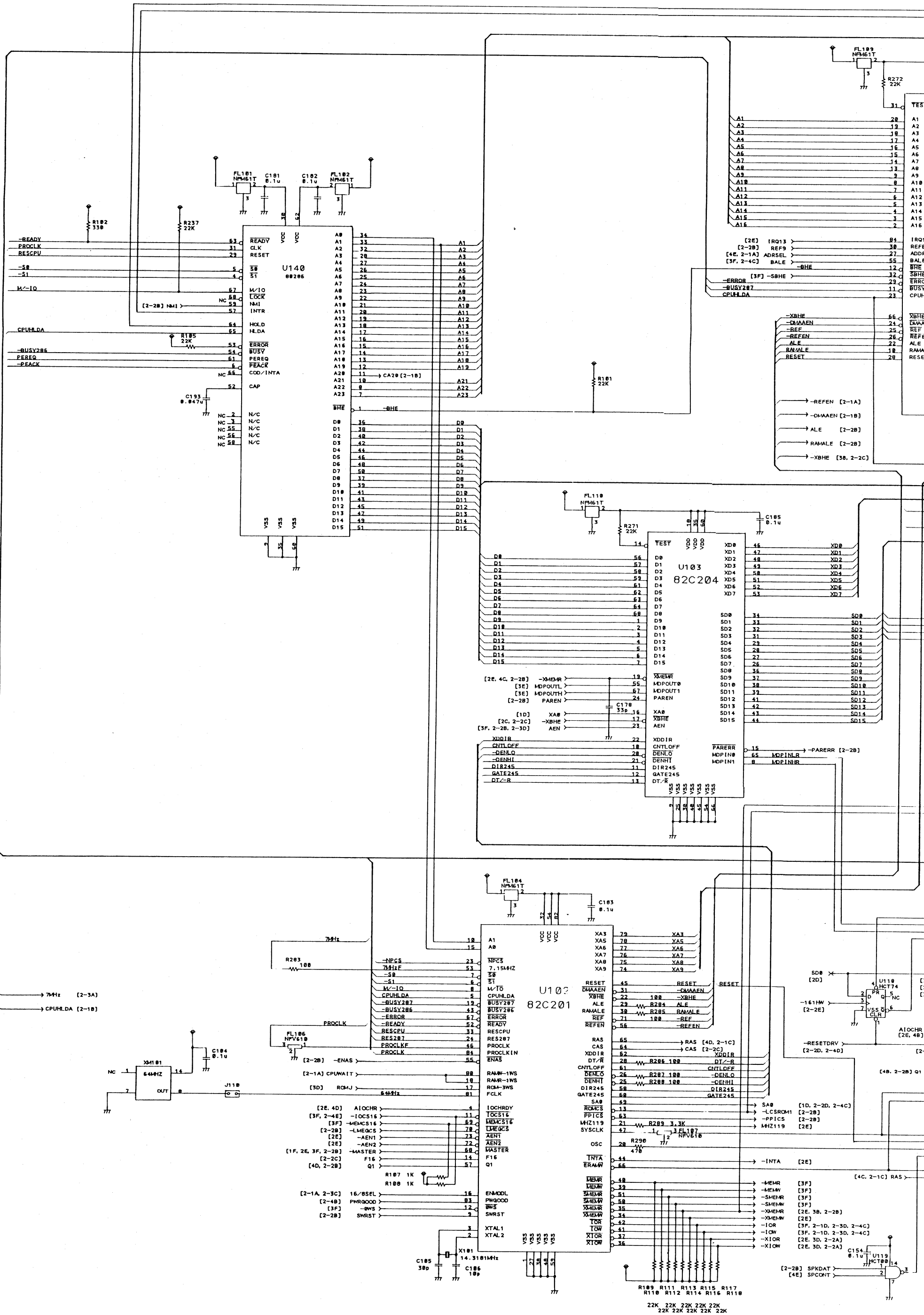
# ALT386SX MAIN P.C.B. TOP VIEW



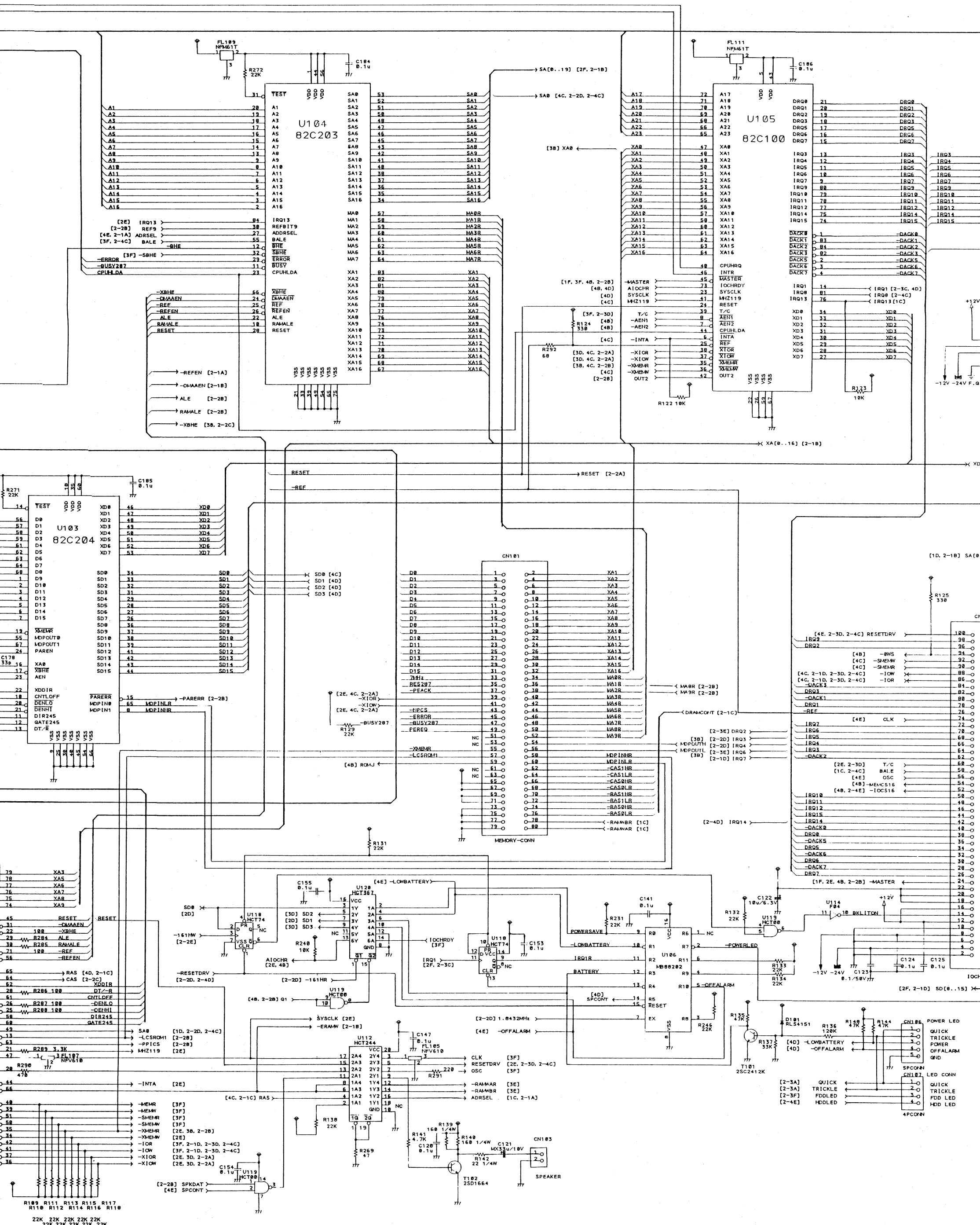


ALT386SX MAIN P.C.B. BOTTOM VIEW





### ALT286 MAIN P.C.B. SCHEMATIC DIAGRAM (1)





The schematic diagram illustrates the electrical connections for a microcontroller-based system. The central component is the U105 82C100 microcontroller, which is interfaced with various peripheral components. The diagram includes a detailed power supply section at the bottom, featuring a transformer (T1), diodes (D1, D2, etc.), and a voltage regulator (U101) to provide stable power to the system. The microcontroller's pins are connected to a variety of input/output devices, including LEDs (POWER LED, QUICK TRICKLE LED, FDD LED, HDD LED), a speaker (T102), and a display (LA17). The circuit also incorporates several integrated circuits (U1, U2, U3, etc.) and a large number of resistors (R1, R2, R3, etc.) and capacitors (C1, C2, C3, etc.) to ensure proper signal processing and timing. The board is populated with numerous surface-mount components and is labeled with various pin numbers and component values.

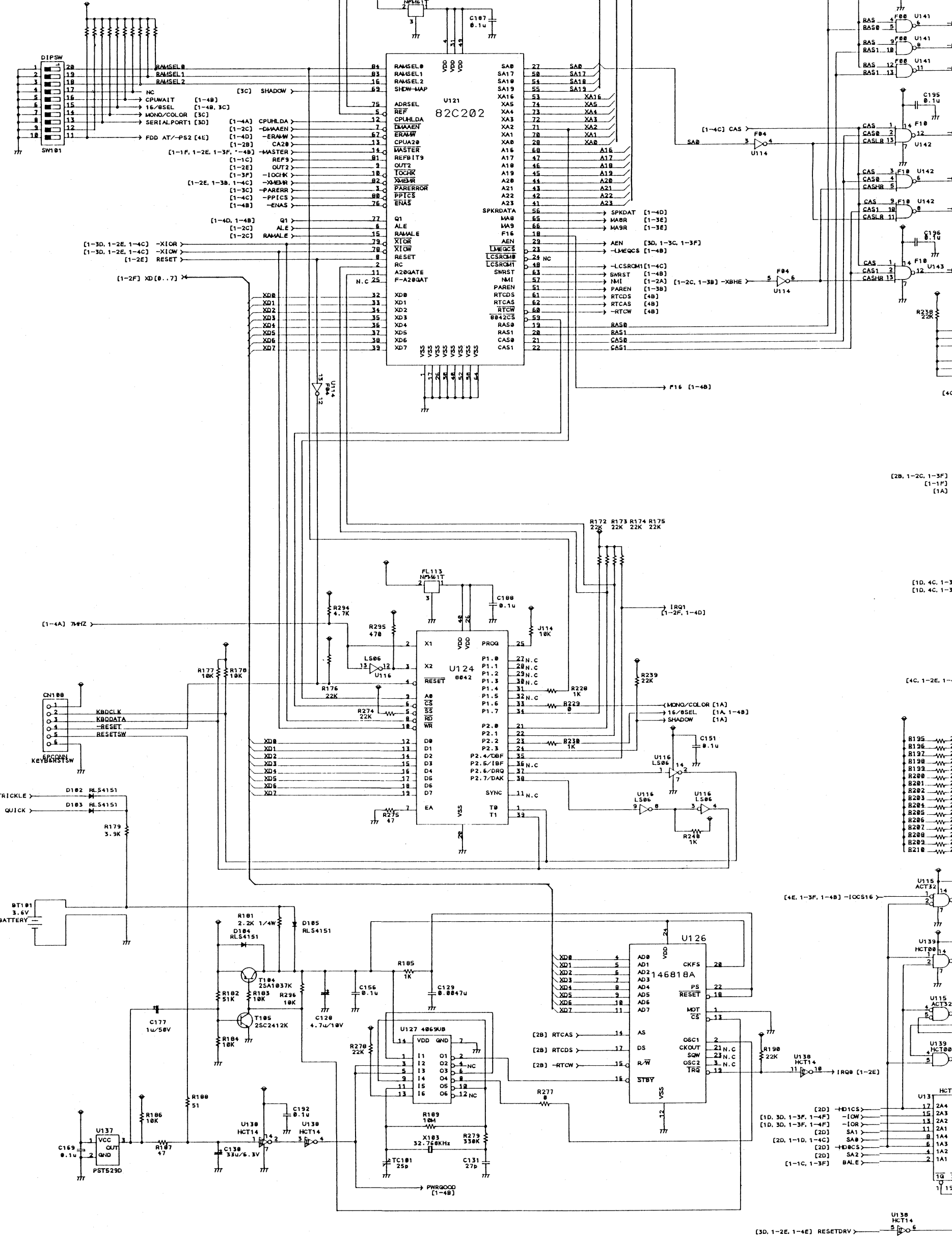


# DIP SWITCH

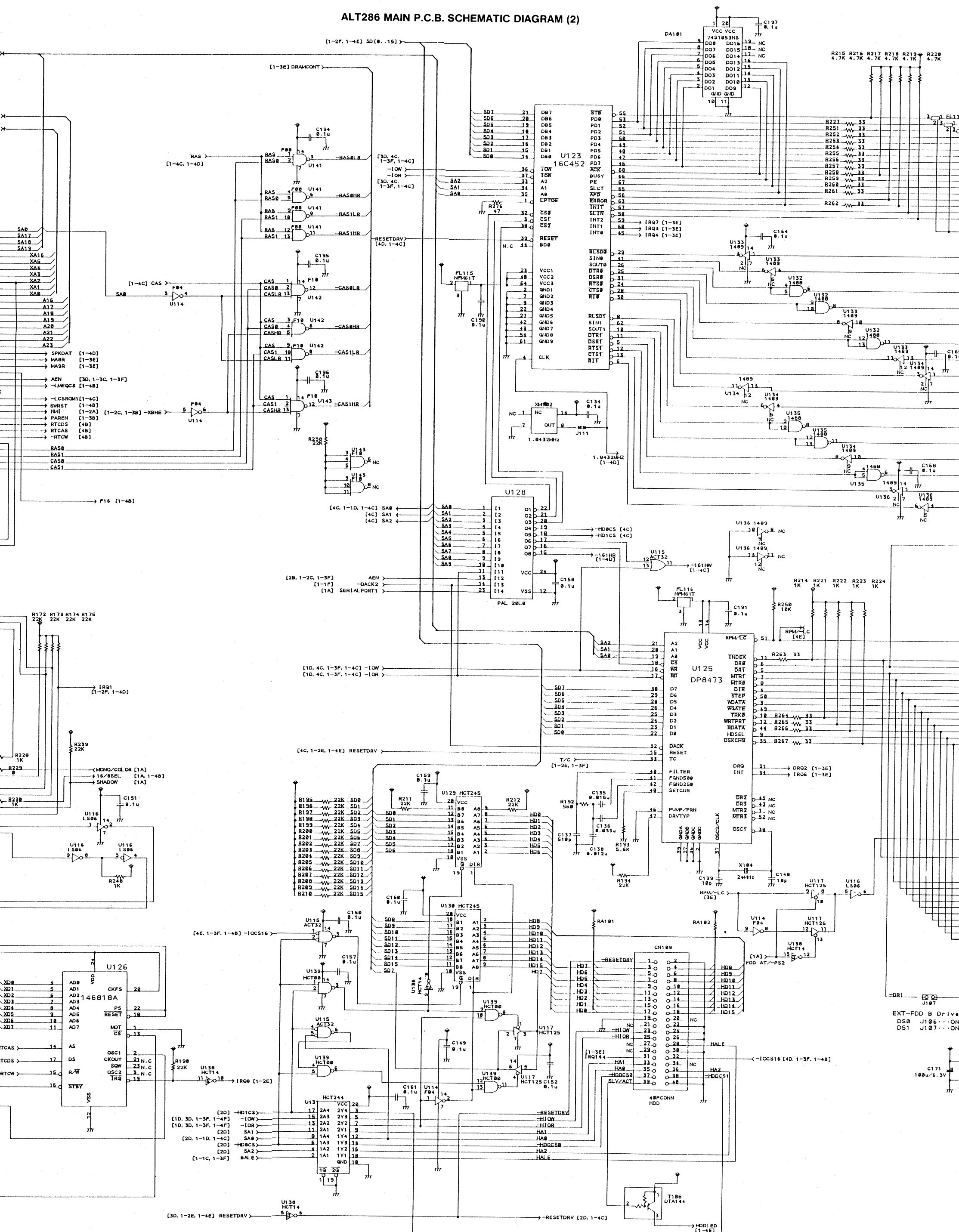
SW.	FUNCTION	SETTING
1	RAM SEL0	OFF ON OFF ON
2	RAM SEL1	ON OFF ON OFF
3	RAM SEL2	ON ON OFF OFF
		512KB 1MB 2MB 4MB

SW.	FUNCTION	SETTING
4	NON	ON OFF
5	CPU WAIT	WAIT 1WAIT
6	CLOCK	8MHz 16MHz
7	MONO/COLOR	COLOR MONO
8	SERIAL PORT1	ENABLE DISABLE
9	NON	ON OFF
10	FDD AT/PS2	PS2 AT

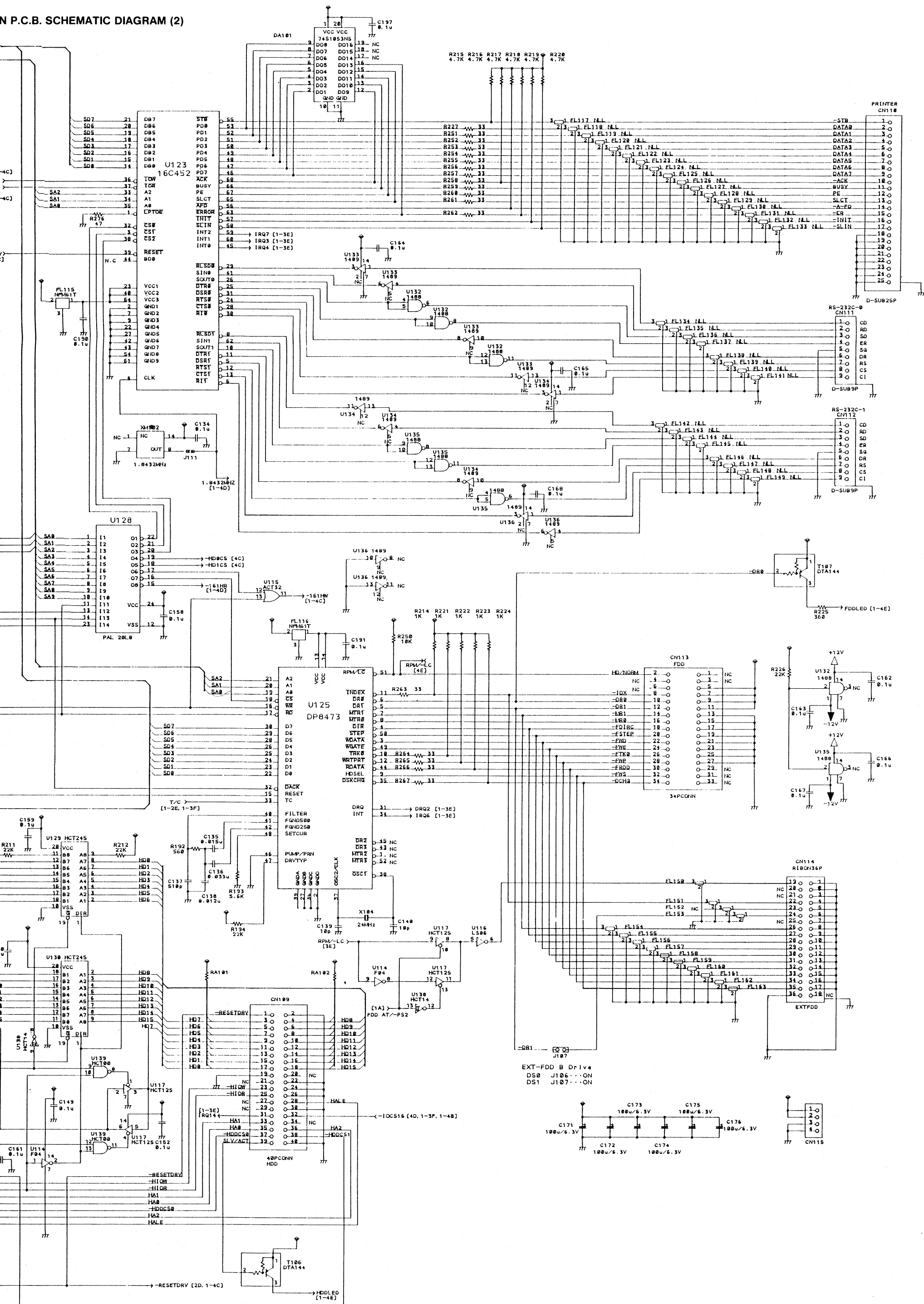
R162 R163 R164 R165 R166 R167 R168 R169 R170 R171  
22K 22K 22K 22K 22K 22K 22K 22K 22K 22K

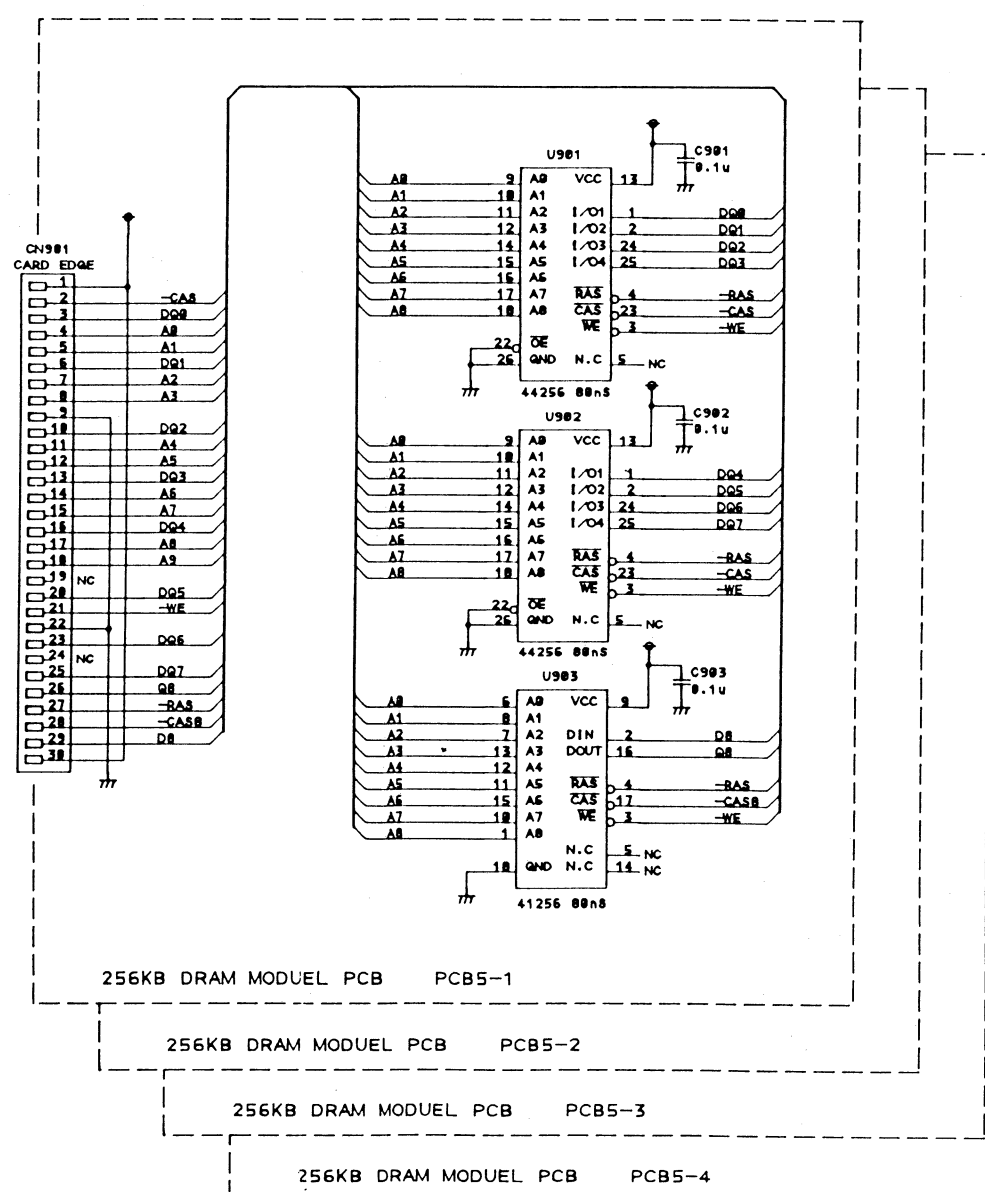
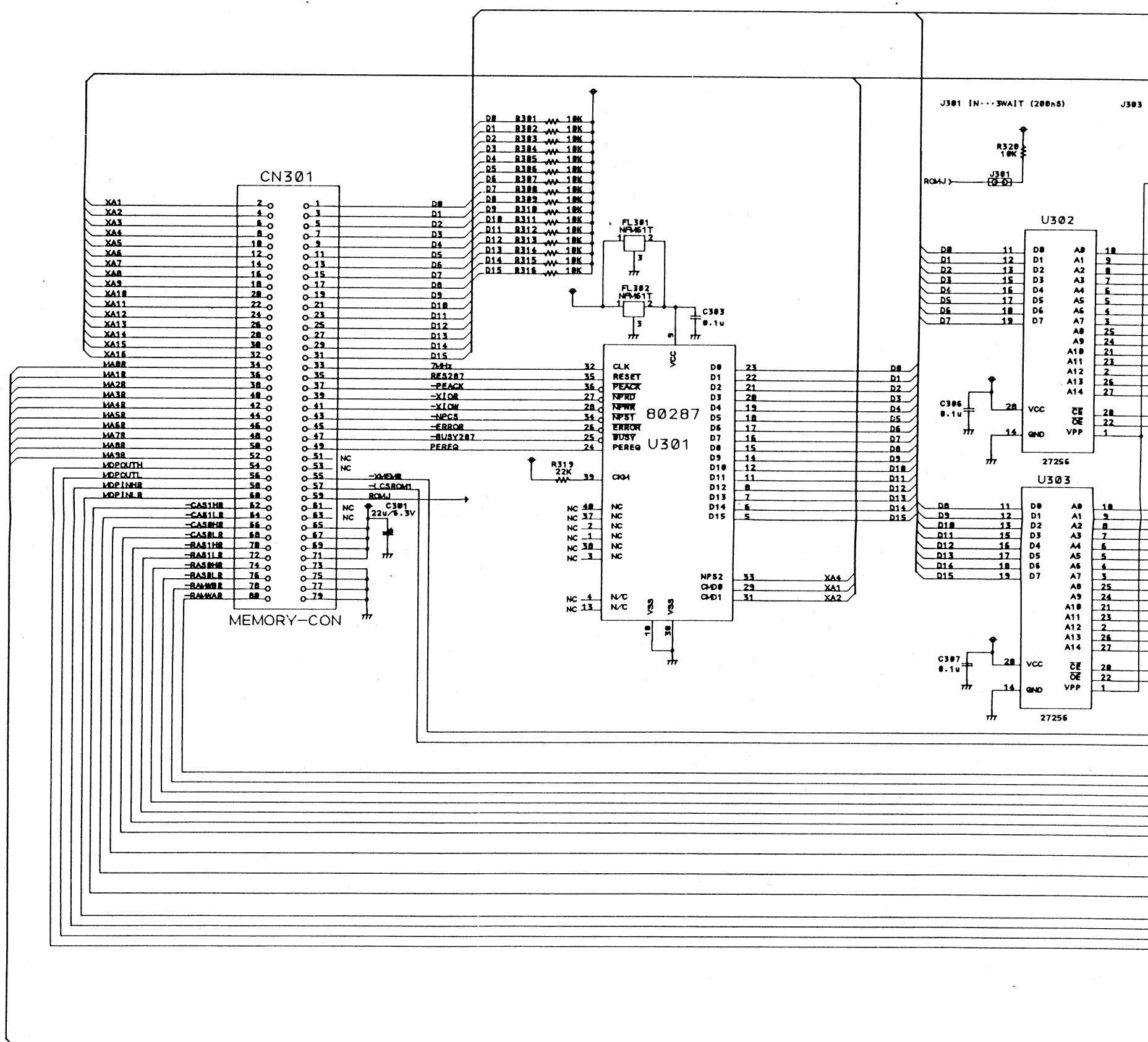


[1-2F, 1-4E] SD [0..15]

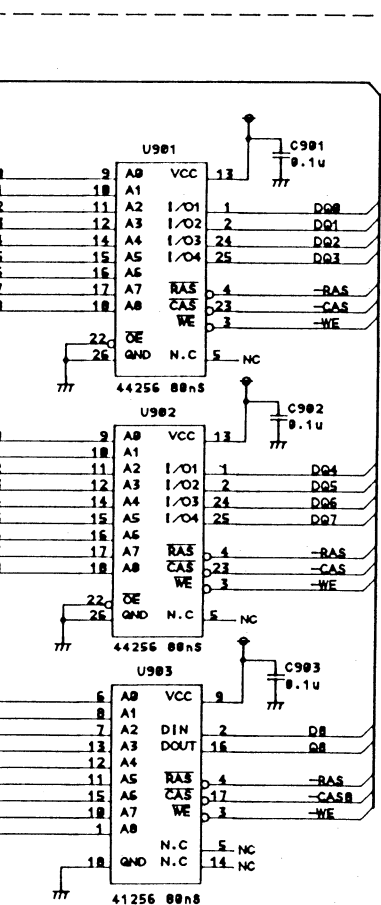
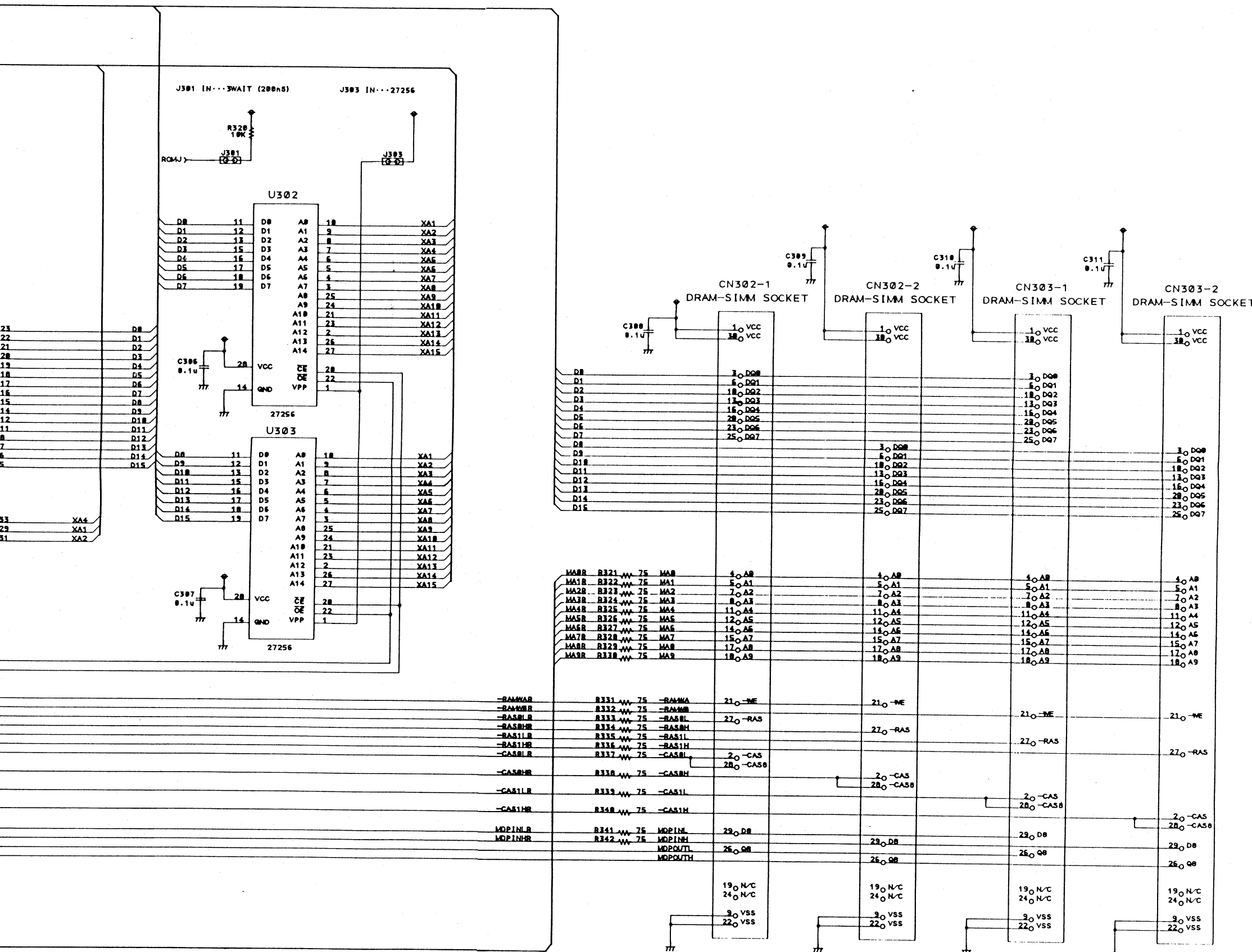


### IN P.C.B. SCHEMATIC DIAGRAM (2)



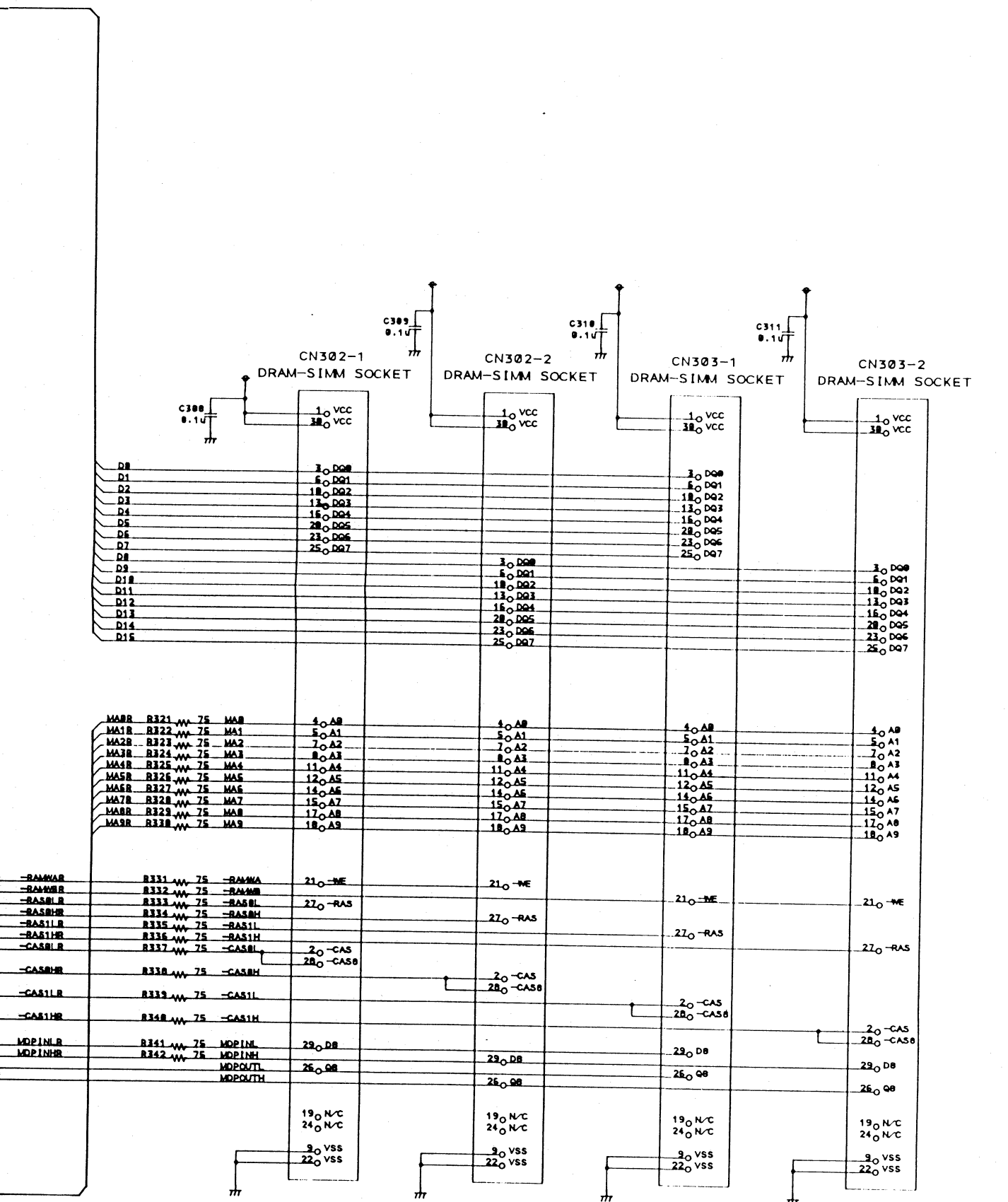


# ALT286 CO-PROCESSOR / MEMORY SCHEMATIC DIAGRAM

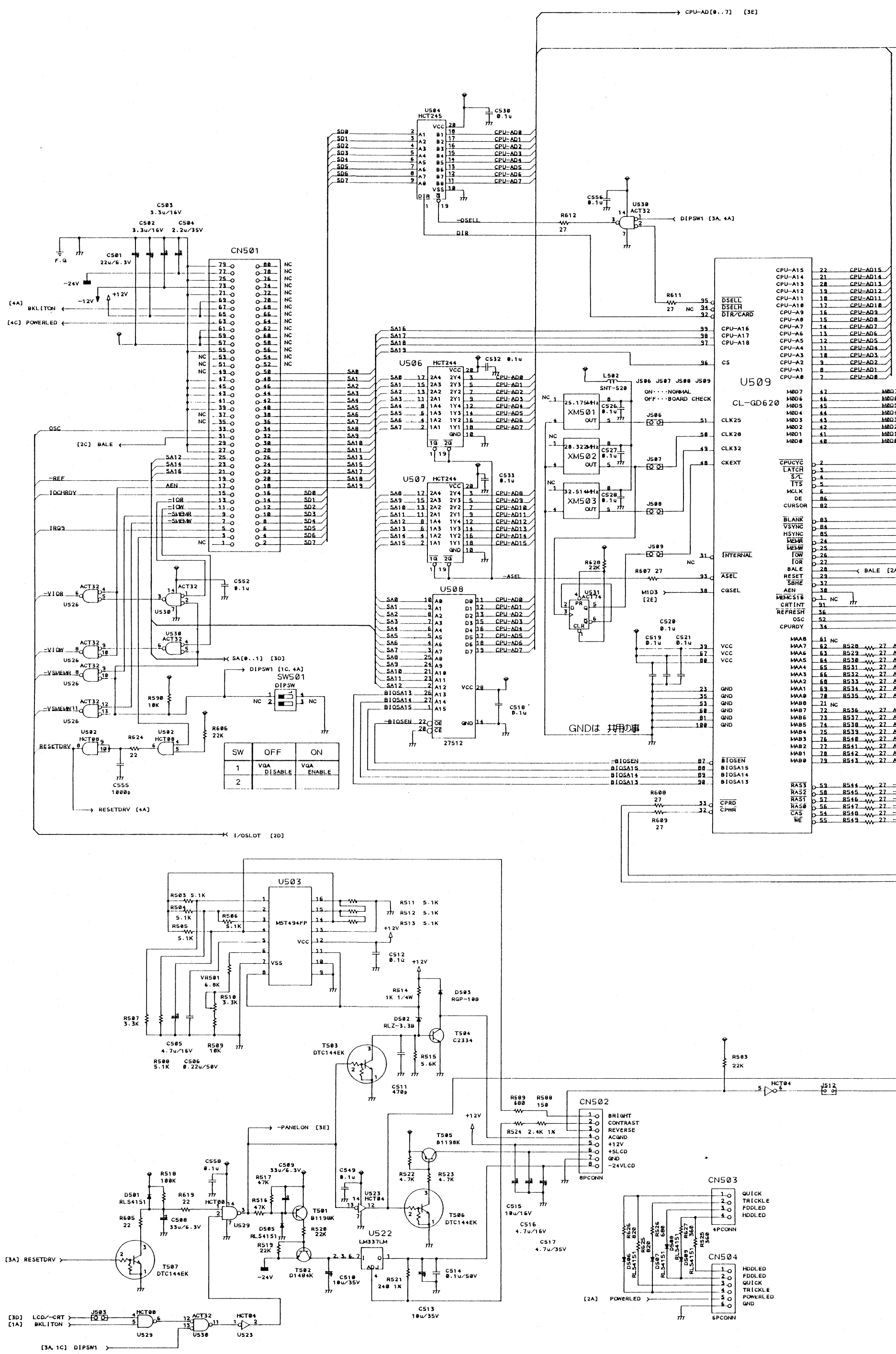


PCB5-1  
PCB  
PCB5-2  
DUEL PCB  
PCB5-3  
AM MODULE PCB  
PCB5-4

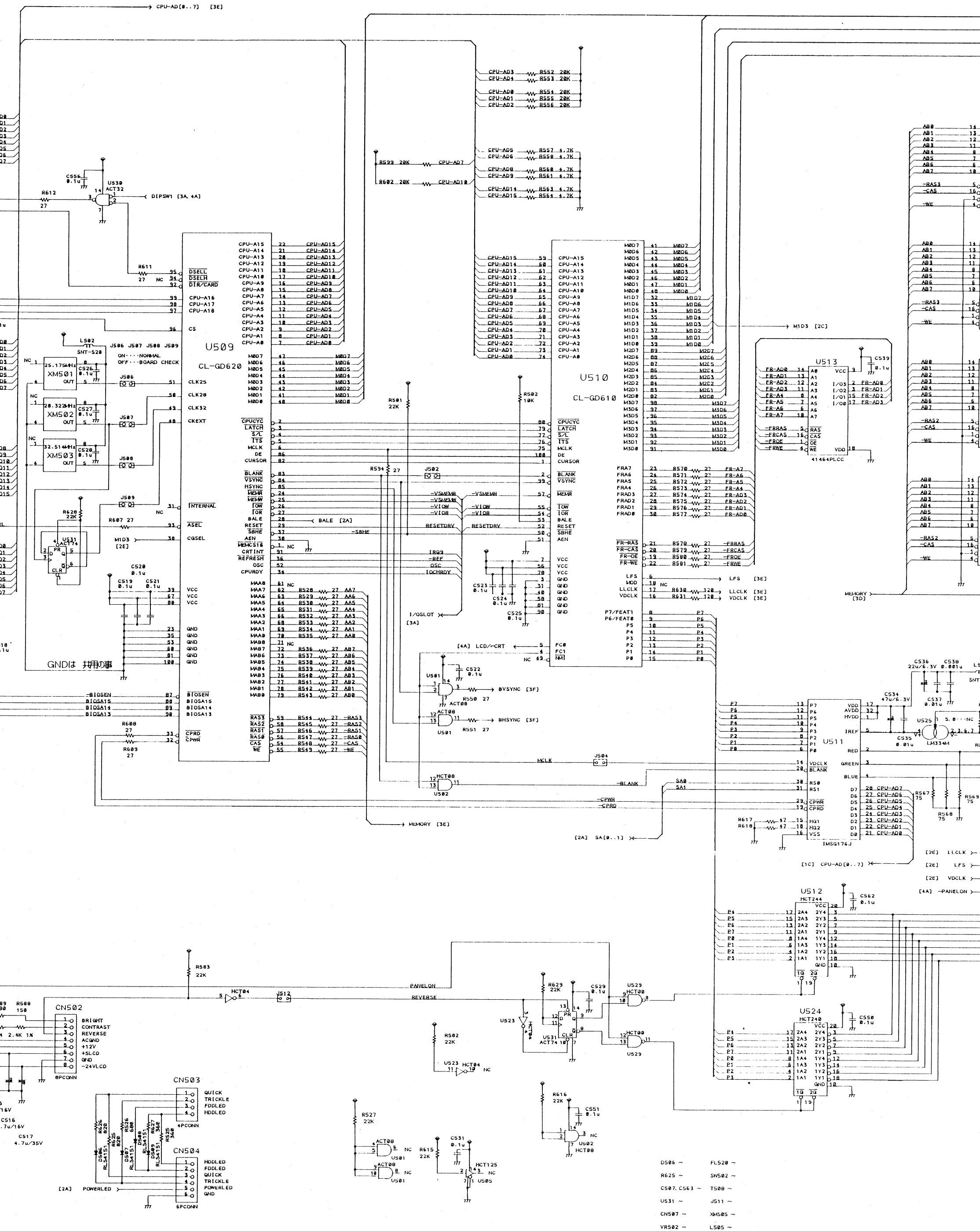




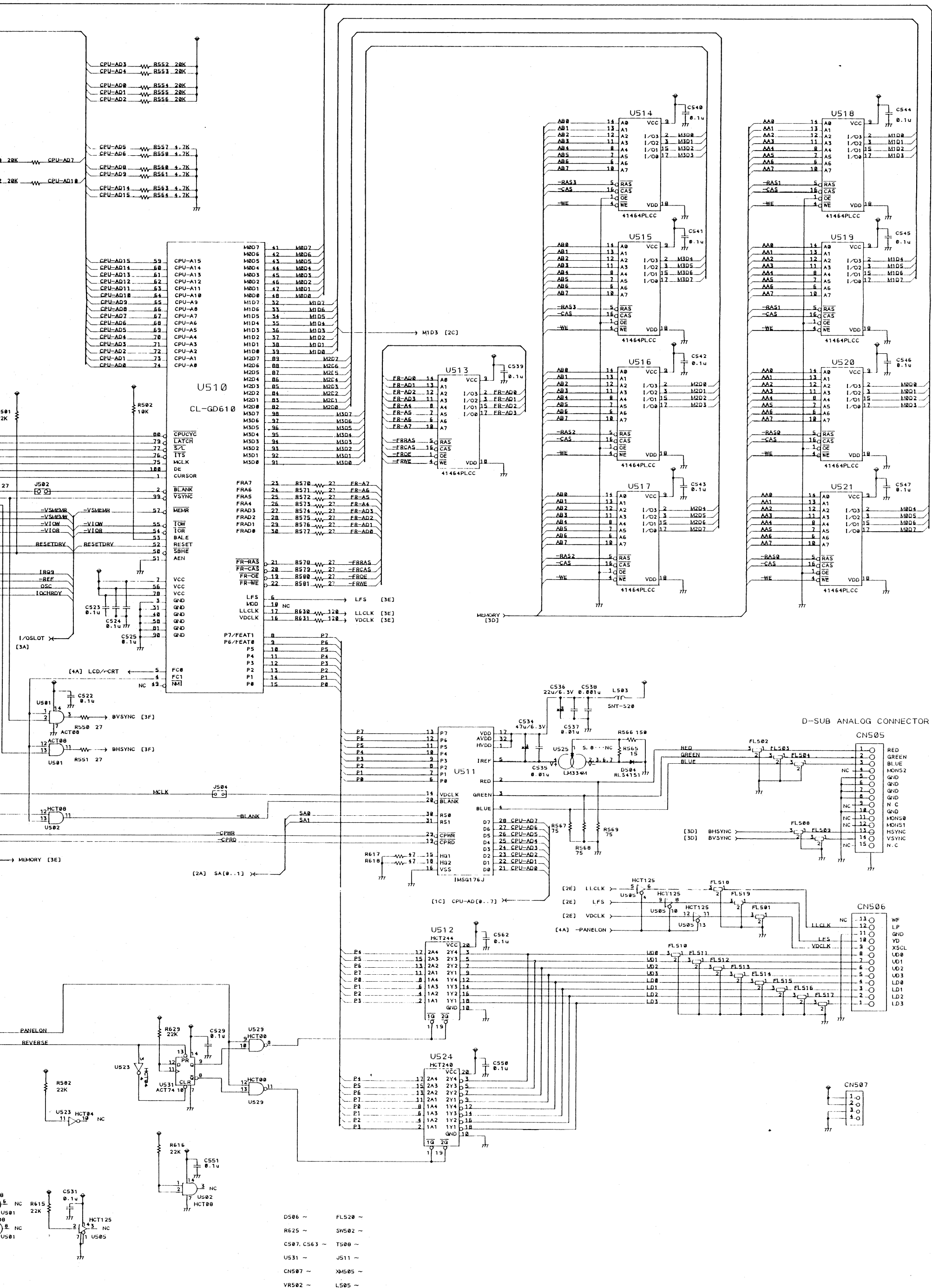
TO  
256KB DRAM  
MODULE PCB  
X 4PCS

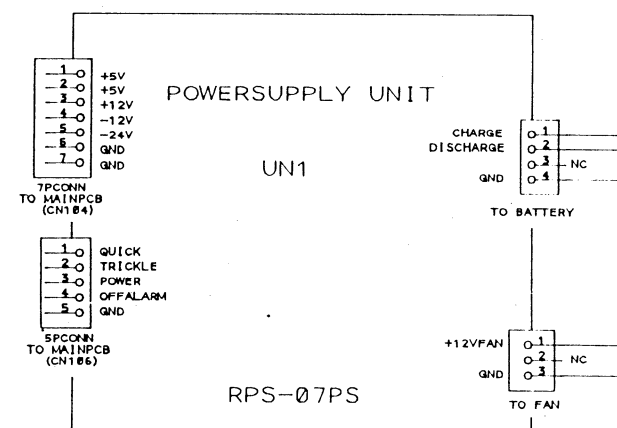
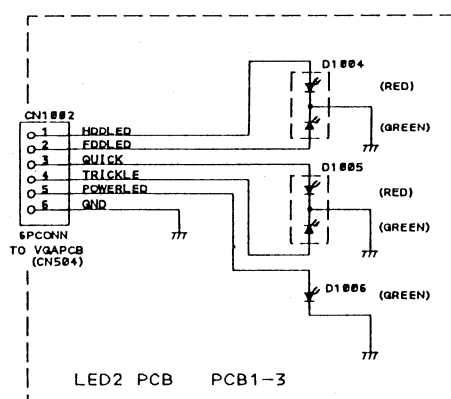
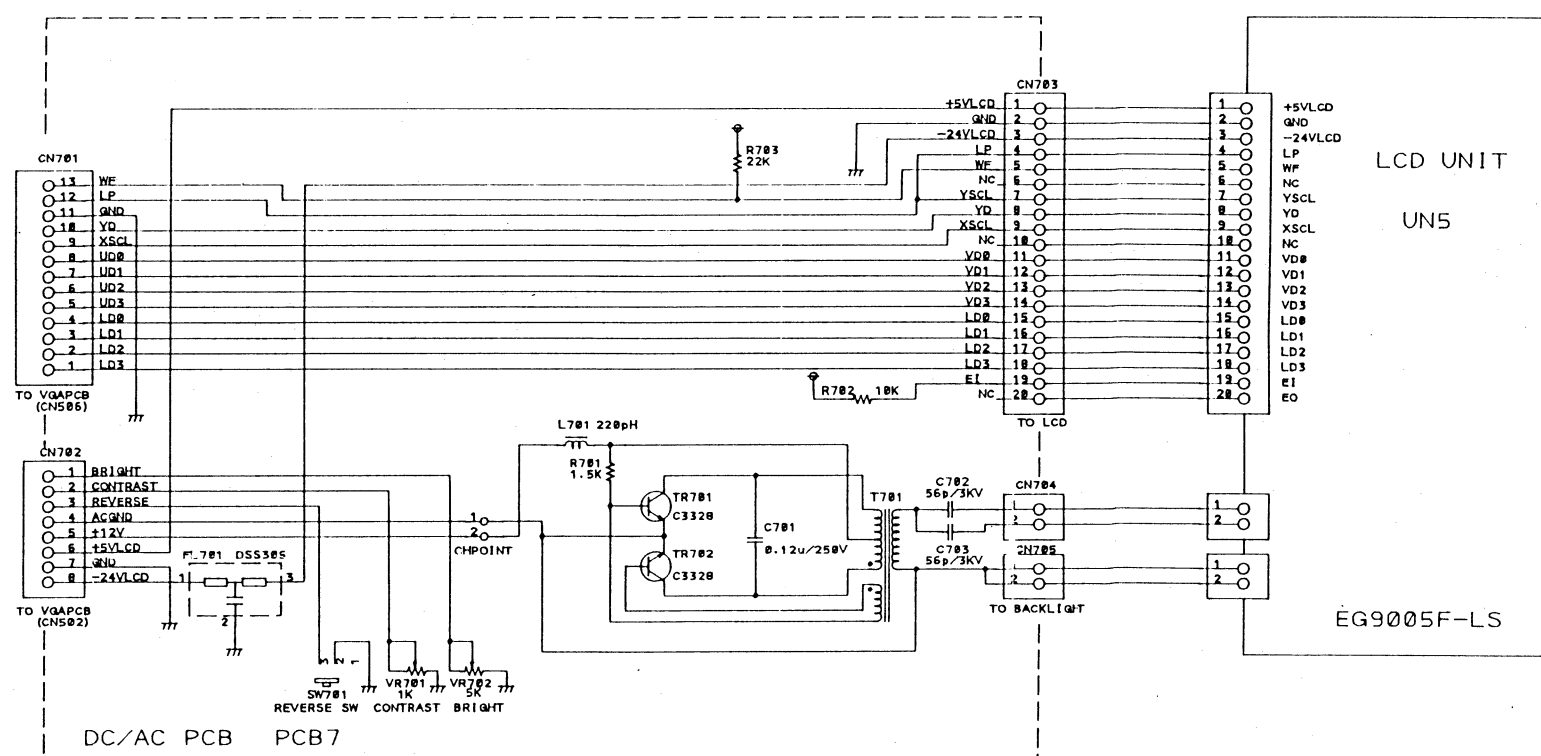
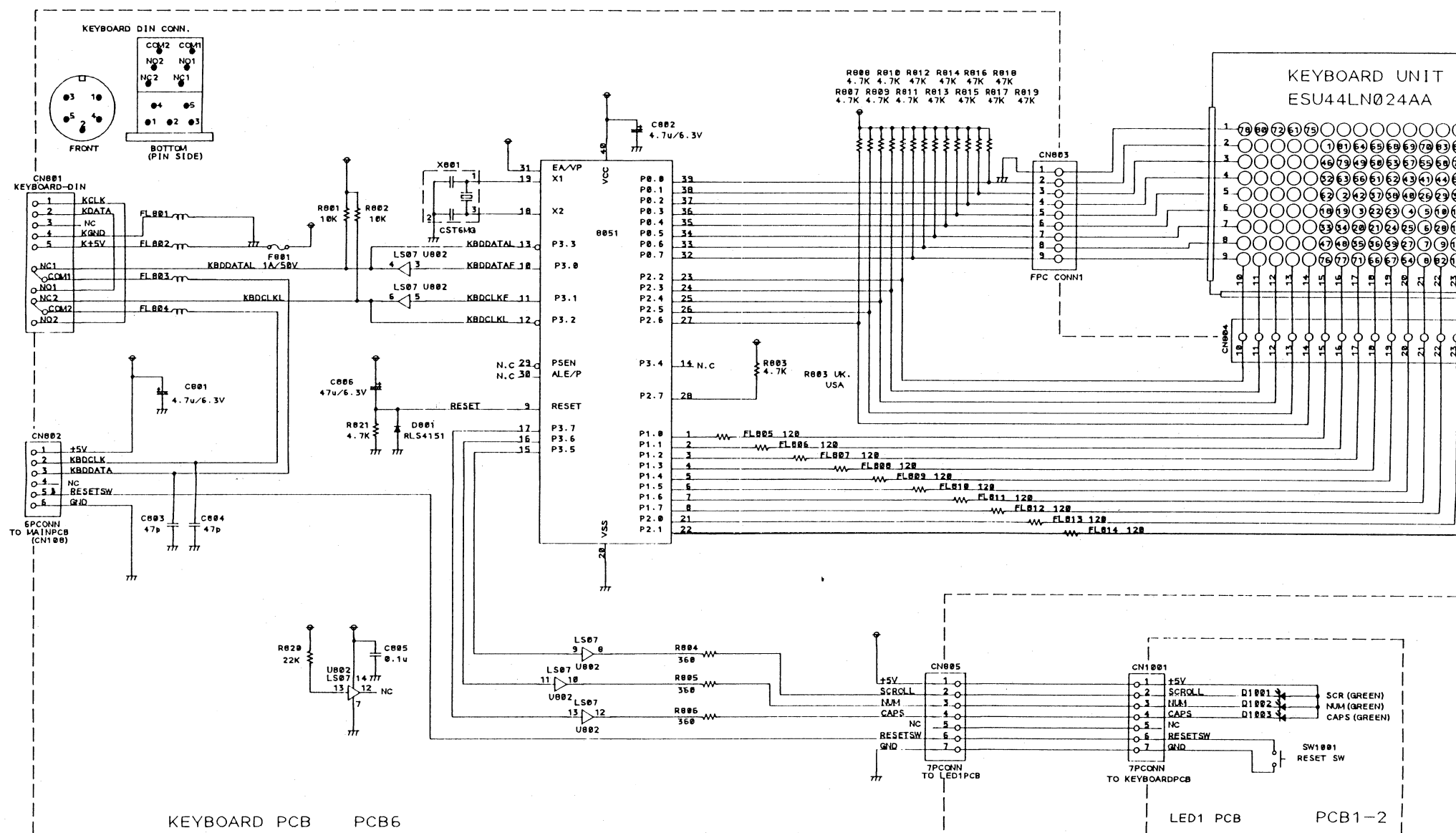


# ALT286/386SX VGA SCHEMATIC DIAGRAM



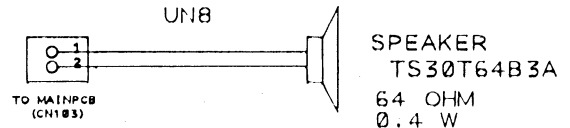
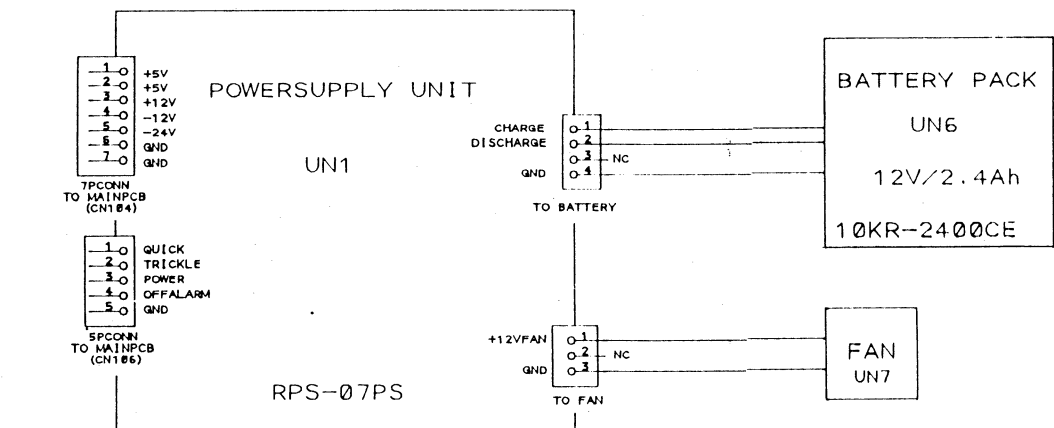
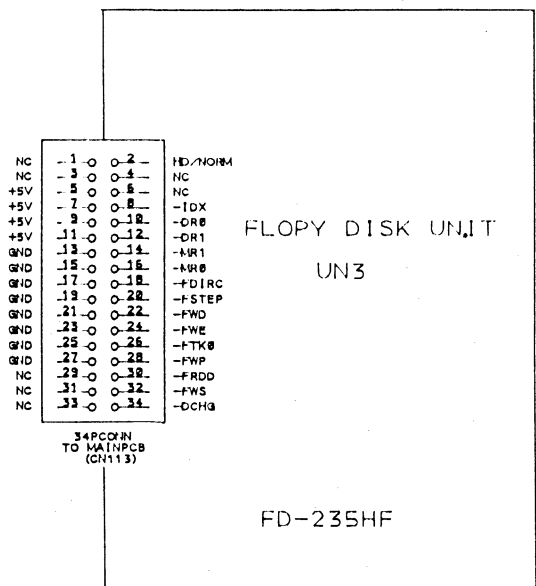
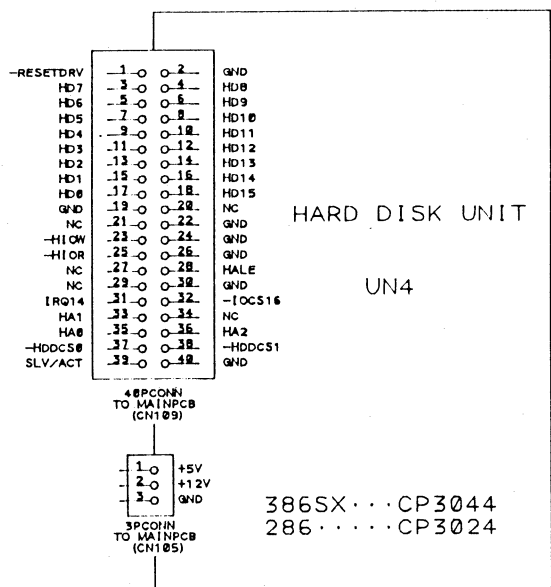
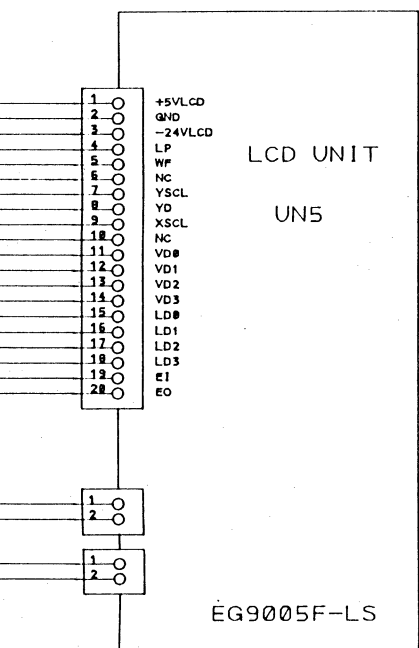
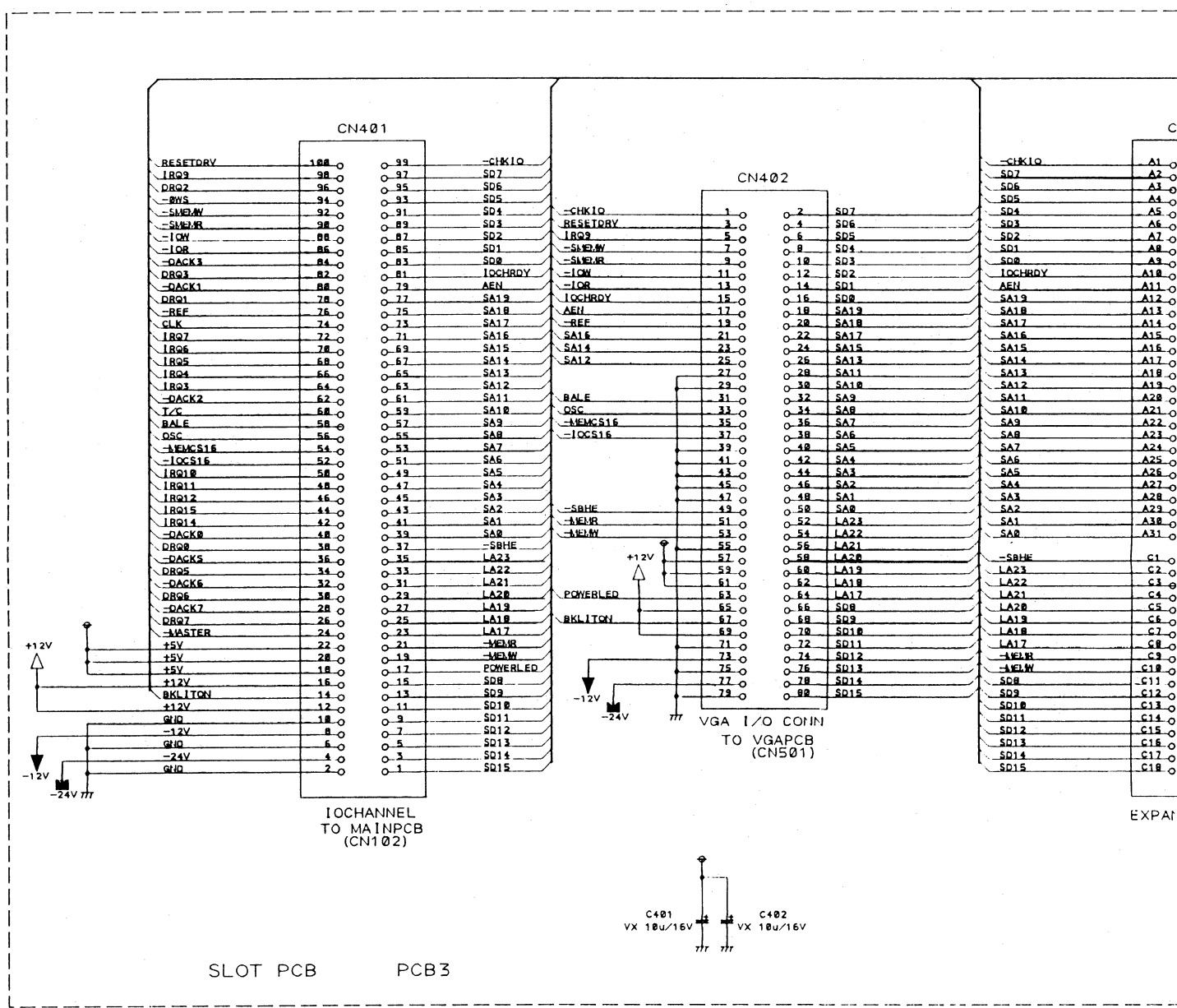
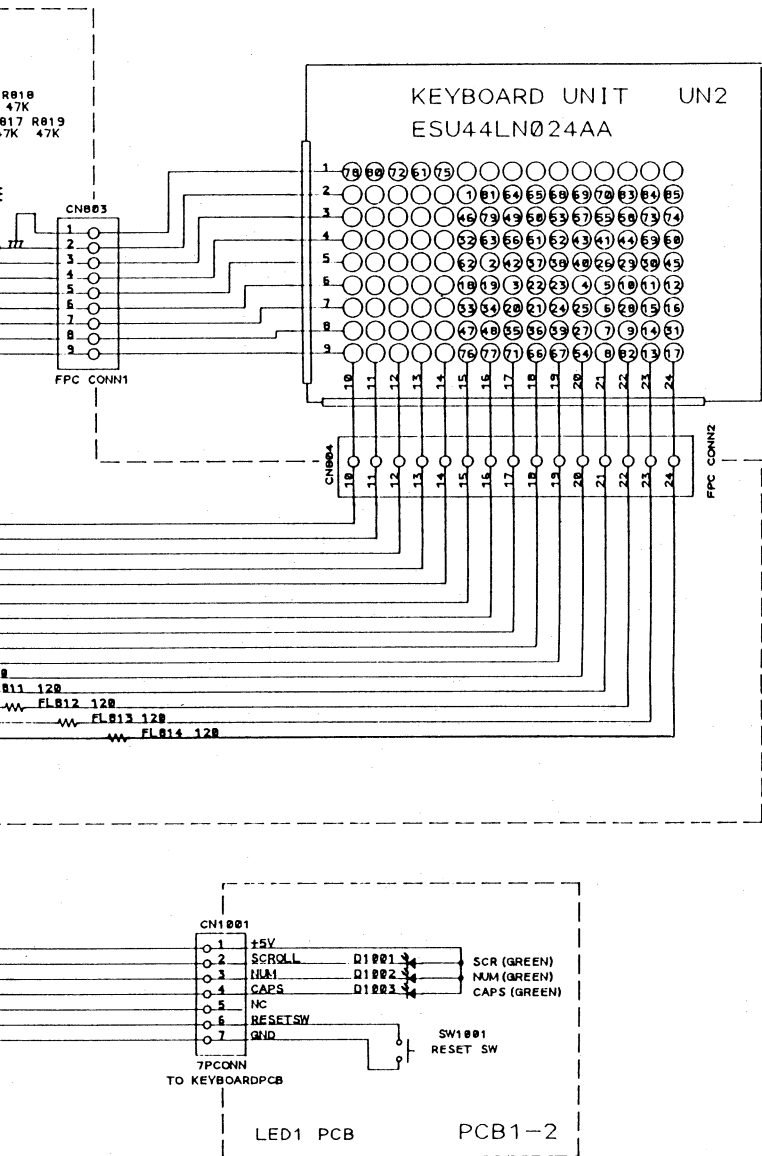
### SSX VGA SCHEMATIC DIAGRAM

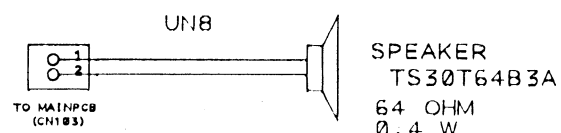
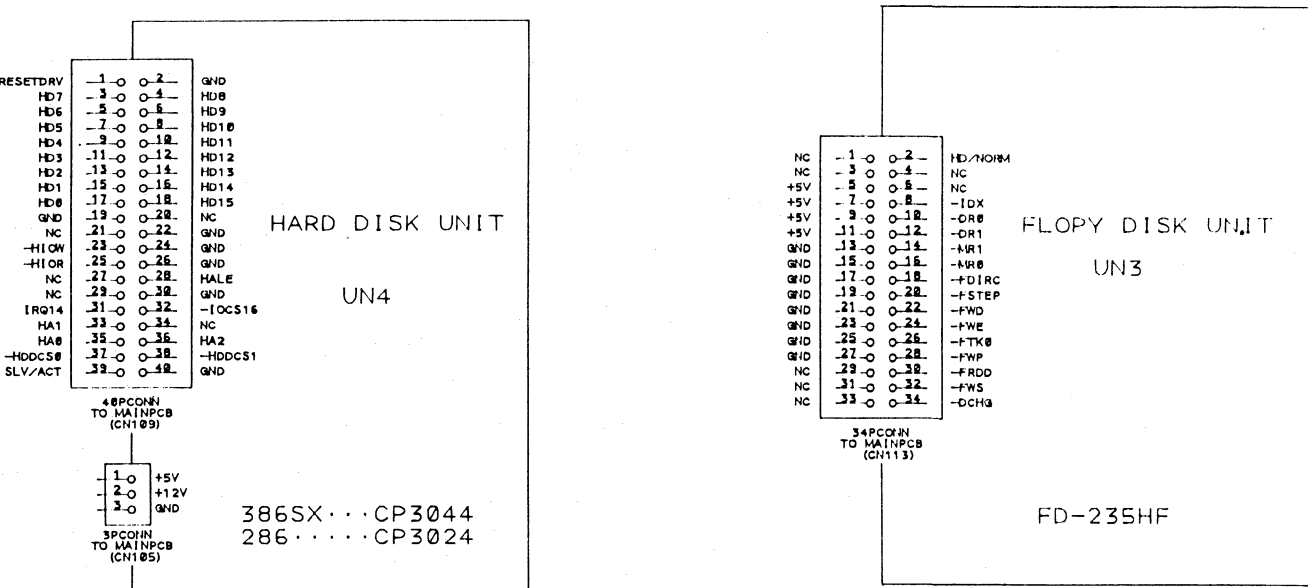
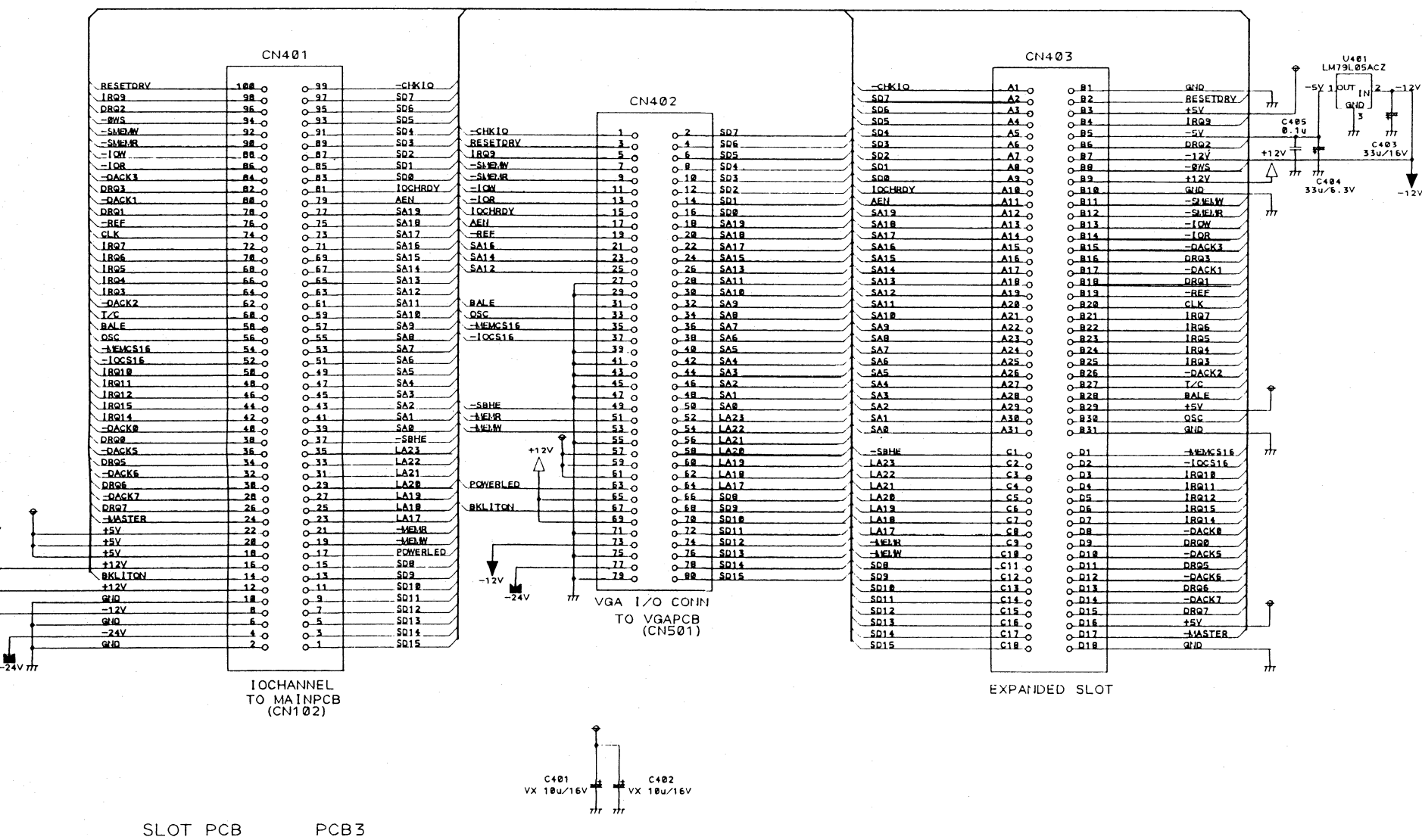






ALT286/386SX PERIPHERAL SCHEMATIC DIAGRAM





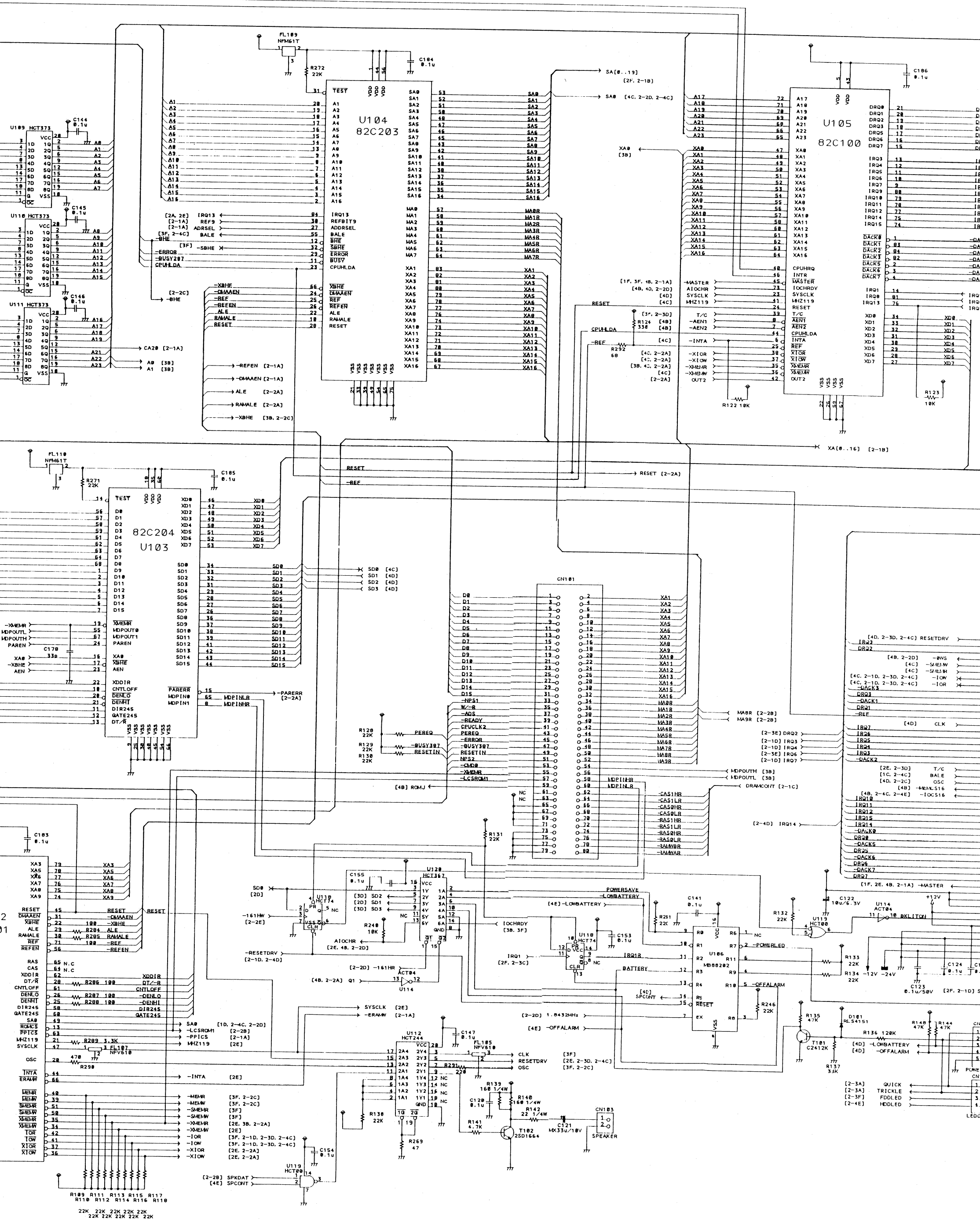
BATTERY PACK  
UN6  
12V/2.4Ah  
KR-2400CE

AN  
UN7

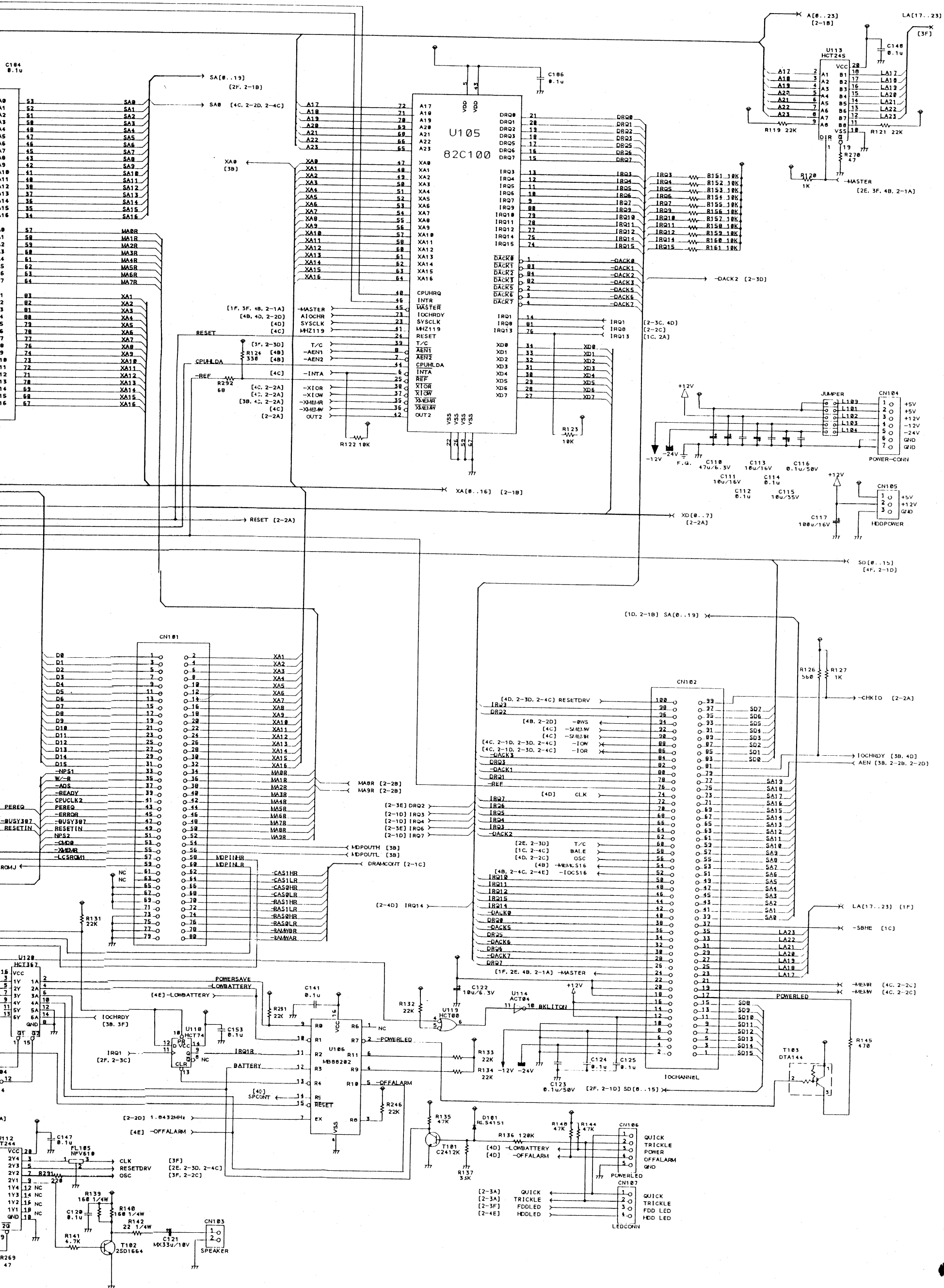




## ALT386SX MAIN P.C.B. SCHEMATIC DIAGRAM (1)



# SCHEMATIC DIAGRAM (1)

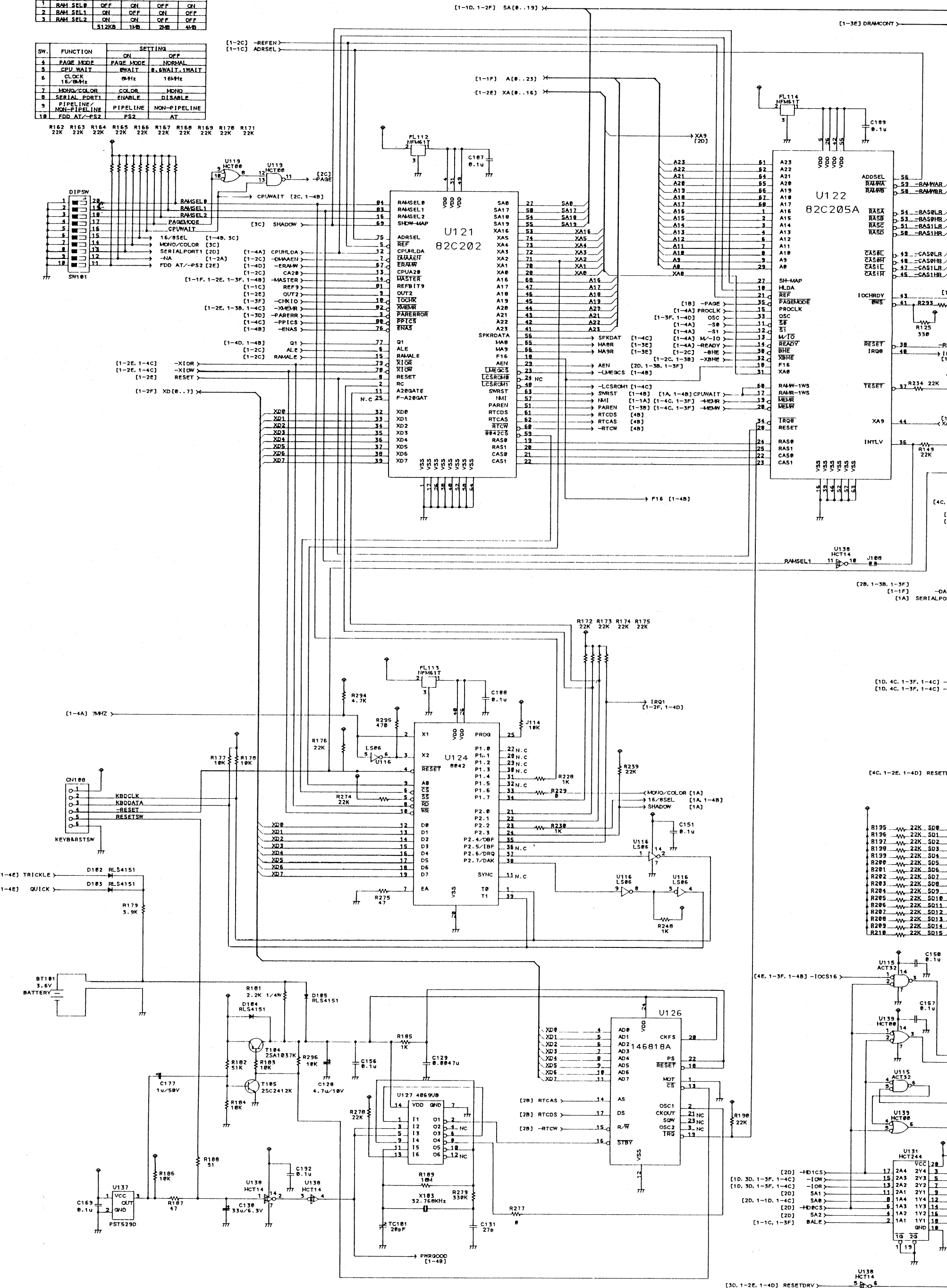


DIP SWITCH

SW.	FUNCTION	SETTING
1	RAM SEL0	OFF ON OFF ON
2	RAM SEL1	ON OFF ON OFF
3	RAM SEL2	ON OFF ON OFF
		512KB 1MB 2MB 4MB

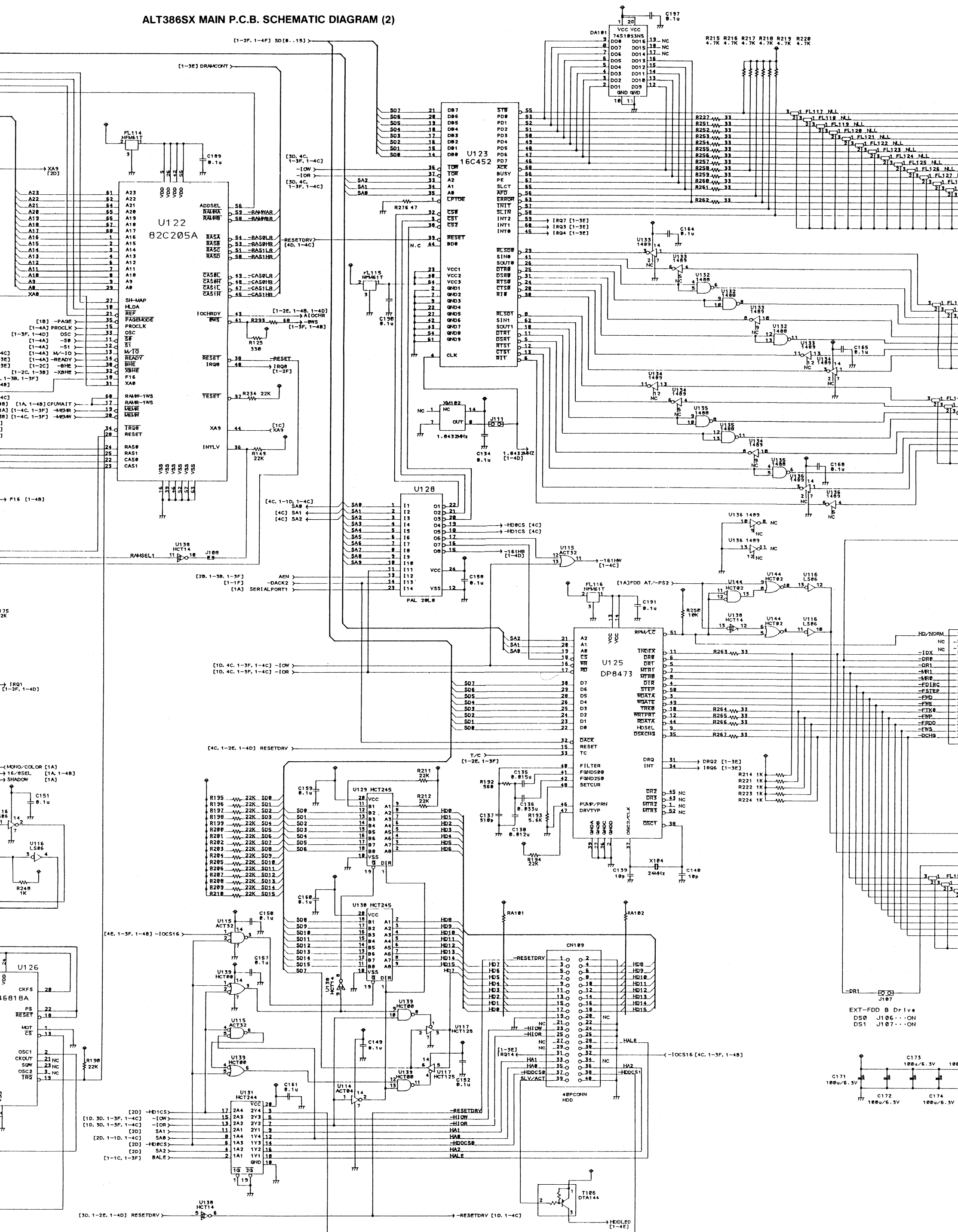
SW.	FUNCTION	SETTING
4	PAGE MODE	ON OFF
5	CPU WAIT	NORMAL B.WAIT.1WAIT
6	CLOCK	8MHz 16MHz
7	MONO/COLOR	COLOR MONO
8	SERIAL PORT1	ENABLE DISABLE
9	PIPELINE/ NON-PIPELINE	PIPELINE NON-PIPELINE
10	FDD AT/PS2	PS2 AT

R162 R163 R164 R165 R166 R167 R168 R169 R170 R171  
22K 22K 22K 22K 22K 22K 22K 22K 22K 22K





### ALT386SX MAIN P.C.B. SCHEMATIC DIAGRAM (2)



## RAM (2)

